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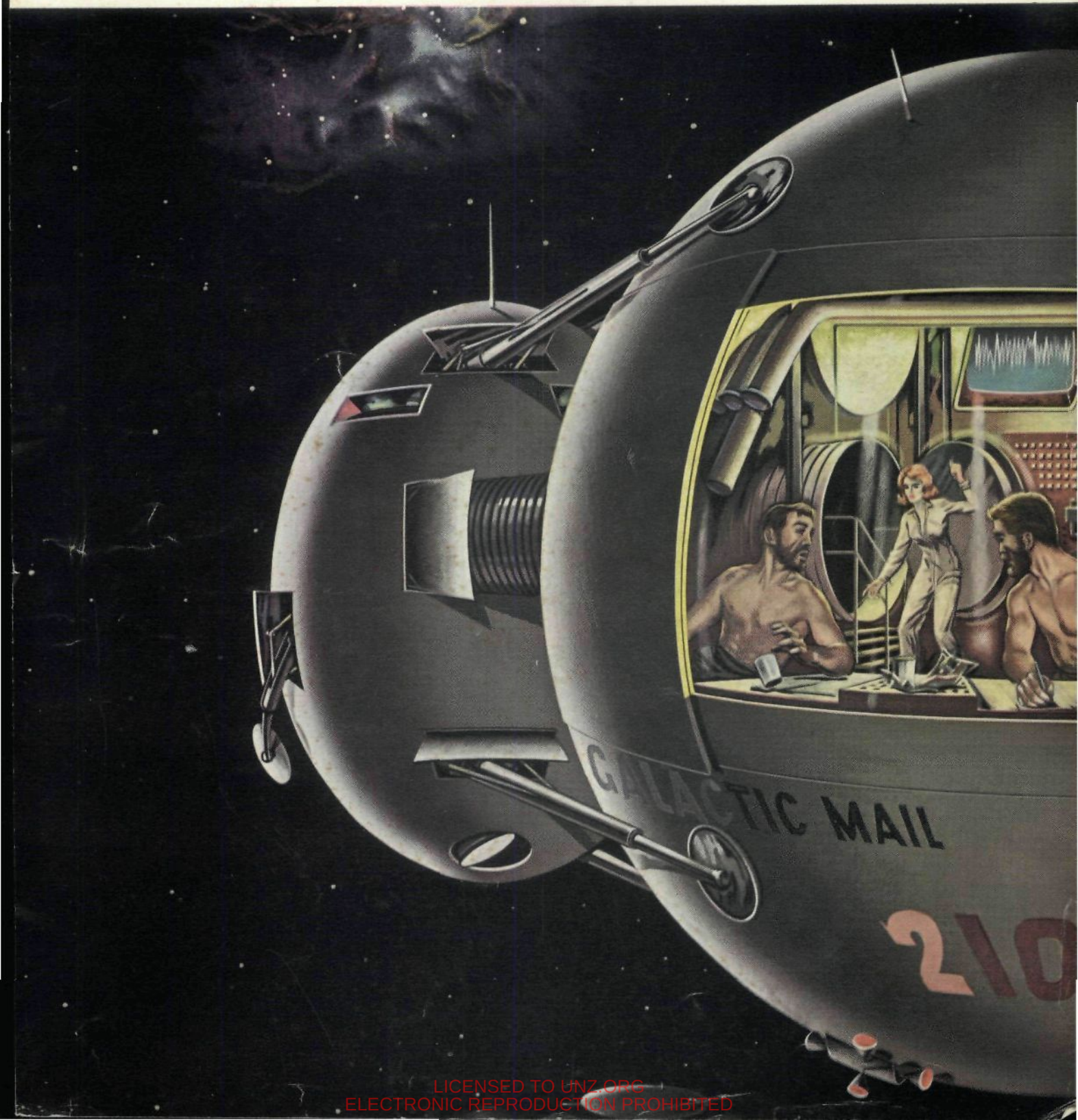

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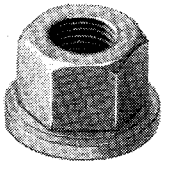
this is one  of them

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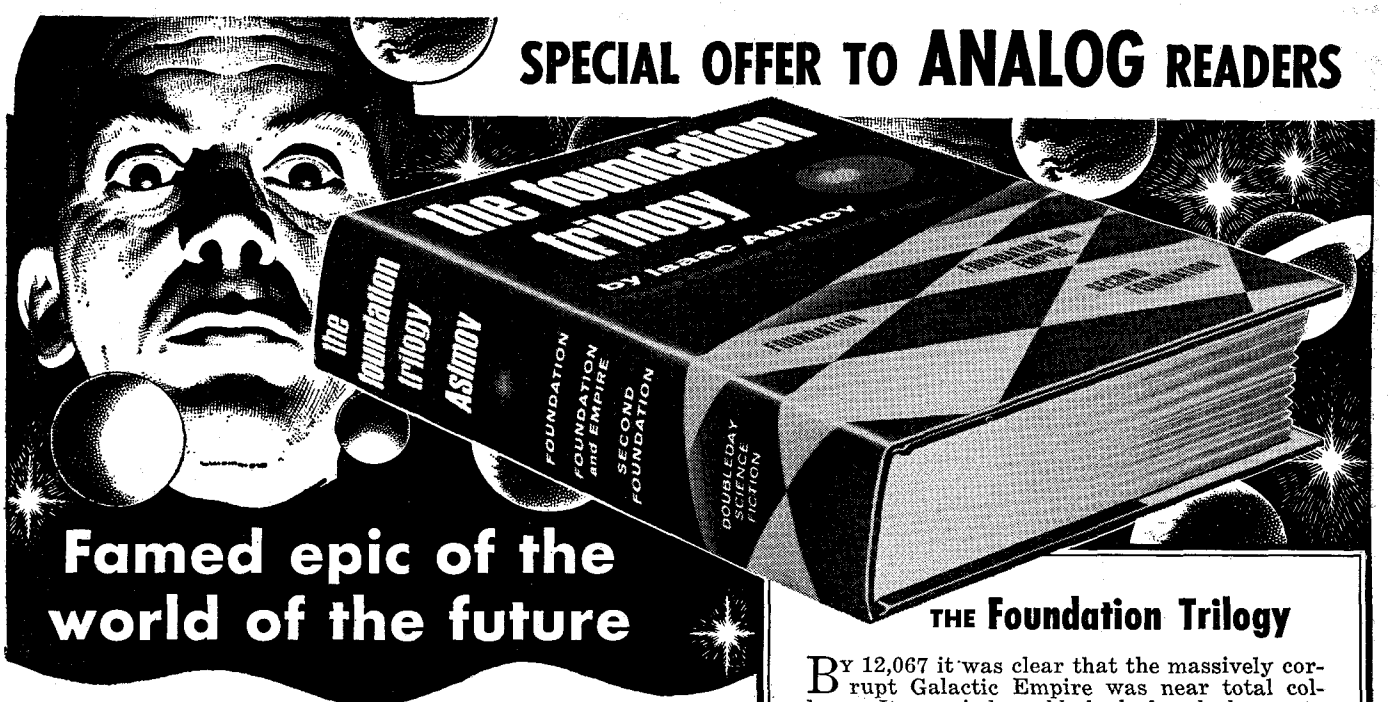

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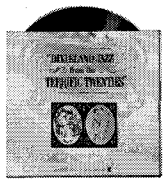

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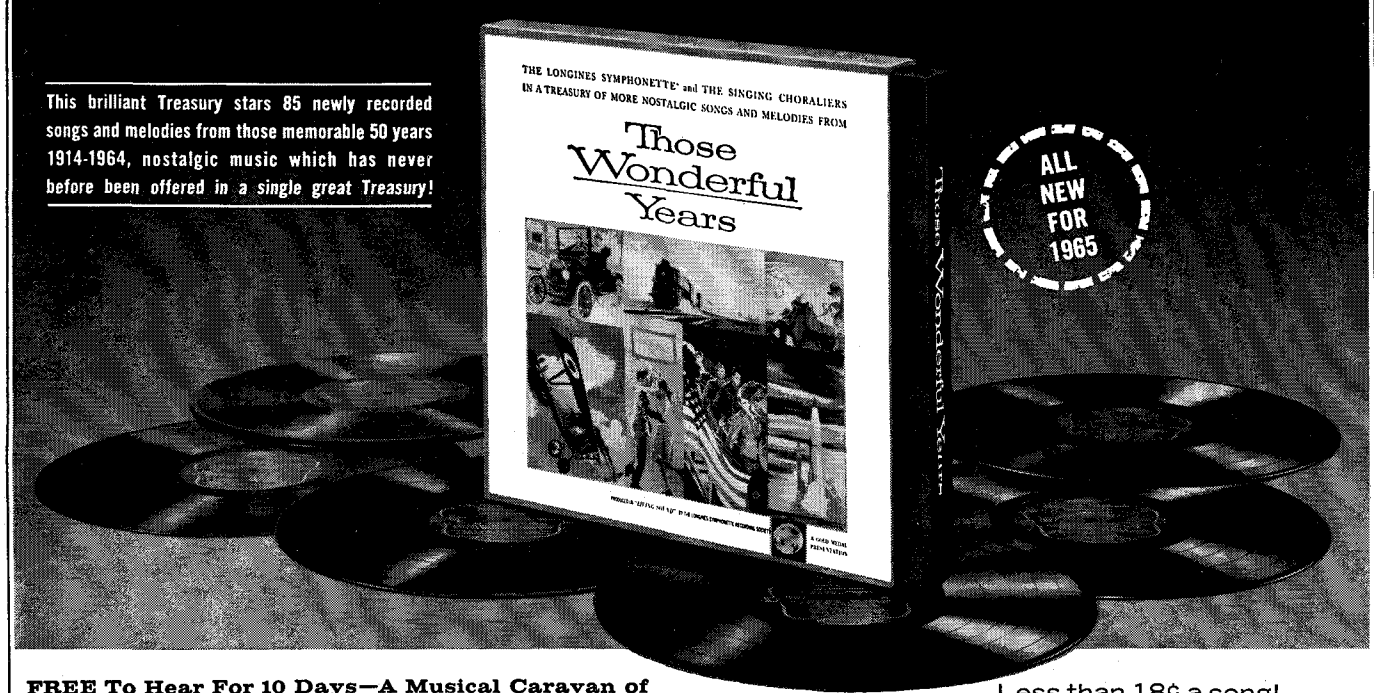
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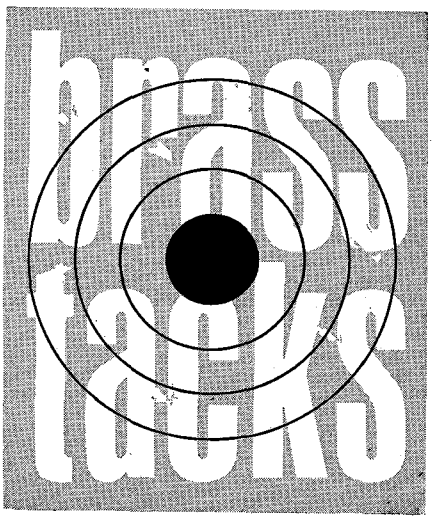

Dear Sir:

Of course you've noted by now that the political campaign has degenerated from a high-minded discussion of the proper political principles our government should follow into an argument about the President's capacity to choose trustworthy associates, a question much less abstract, and much easier to set forth in terms that the voting public can comprehend. The plain truth is that a great many of us voters are not equipped to weigh principles against each other, and are uncomfortable when we have to do it. It is much more comfortable to take sides against the Bad Guys, as in a Western. That is why personality counts for so much in our campaigns, and why the *effective* issues, this year as always, seem peripheral and almost irrelevant, compared with that basic issue of the direction our government ought to take, which you were rejoicing would come up for decision in your latest editorial.

However, it's not so much a matter for joy as you think when our parties polarize around some fundamental problem. We have had such polarizations, and the results should warn us against wanting any more of them. The machinery works much better when the question is merely more versus less of the same thing, as it has been during the last few elections. We may not be making any fundamental decisions, as in theory we should, but at least the losers are not so frightened that they will resist by force if necessary, and die to prevent the winners from having their way. They know that they can live under their opponents' rule, and come back at the next election to fight for their cause again. After all, one of these years when we did make a fundamental decision was in 1860. The South felt that it could not live under an antislavery national administration. That good politician Lincoln devoted most of his first inaugural address to trying to prove to them that they could so live, without success, and his second inaugural to trying to reconcile them to the results of the war. This was right and necessary; the winner must always try to minimize the gap between himself and the losers. Principles are all very well, but too often in practice they act like gravel in the gears. The politician is the man who makes the governmental machinery work, regardless of theory and principle. One man may be right, and another wrong, it is true, but unless you are willing to shoot your opponent to keep him from interfering, you simply must make allowance for what he wants, and let him have a little of it. That a politician will give up many principles to get himself elected should not be sneered at too loudly. That *is* his fundamental task. If he doesn't get elected, he can't do a thing, and even if he is a bit of a hypocrite and a liar, he doesn't have to use bayonets to force his constituents to obey him, at great cost in both pain and money.

Another such polarization happened in 1896, when the populists captured the Democratic party, just as the Goldwaterites did the Republicans this year. There was no doubt that the country was in trouble, and needed something. The Gay Nineties—bah! There was one *honey* of a depression, and plenty of poor devils who had every right to object to the situation which existed. Yet they lost the election, and worse than that, they lost the position the Democratic party had had ever since the political situation had stabilized following the Civil War, within half a million votes of the Republicans—a position which made

continued on page 92

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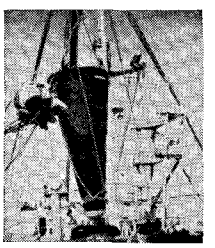

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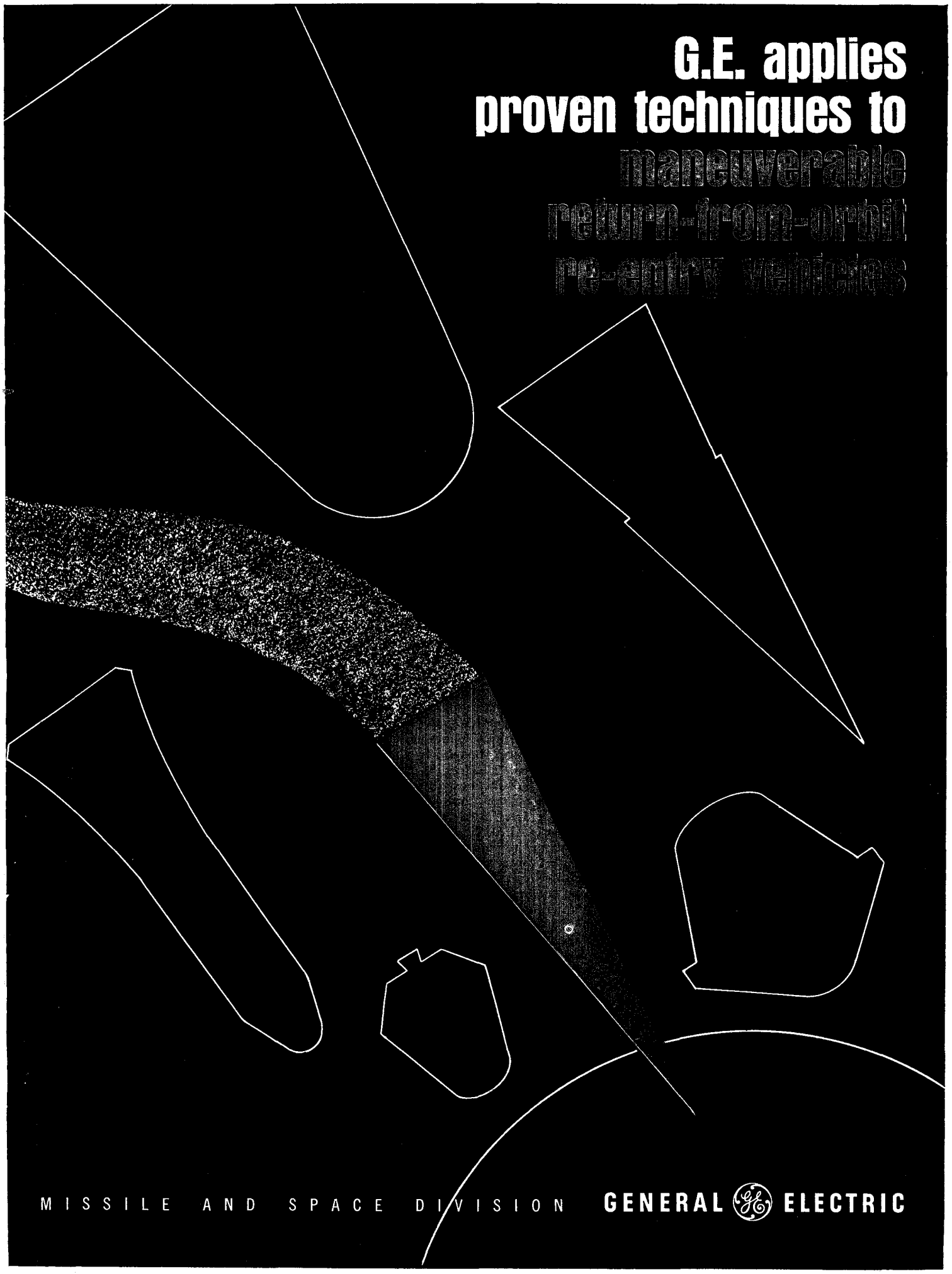
G.E. applies proven techniques to maneuverable return-from-orbit re-entry vehicles



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Forgotten road to success in writing

One of America's highest paid free-lance authors tells of opportunities often overlooked by people who want to write

By J. D. Ratcliff

I can't understand why more beginners don't take the short road to publication – by writing articles for magazines and newspapers.

Last year over 250,000 articles were bought by general magazines alone. And that's only part* of a huge market that will pay well for pieces of almost any length on just about any subject that comes naturally to you. I've made a good living for 25 years writing articles, and I've enjoyed every minute of it.

A wonderful life

I've interviewed a dozen Nobel Prize-winners, including Sir Alexander Fleming who discovered penicillin. I've talked with heads of state, at least one king, scores of leading industrialists. In the past year, I covered stories from Bangkok to Buffalo.

It's a wonderful life. No commuter trains to catch, no office routine. Whether I'm at home, or abroad on assignment, I write from 8 a.m. to noon every day – no more, no less. My afternoons are my own.

How to pick subjects that sell

A big advantage of article writing is that you can break in with material right out of your own everyday experience. One of the first pieces I sold was about the adventures of a test pilot I knew. Another told the story of a friend of mine caught in a balloon that ran wild. Check the contents of any general magazine; chances are you'll find articles you might have written.

You can make good use of your special interests too. One of mine is science, and it's provided dozens of story ideas – from accounts of dramatic new heart operations, to a report on an astronomical observatory built out of salvaged junk. Your passion may be insurance or religion or football, raising roses or raising children. Whatever it is, you should be able to draw on it for articles that could inform and entertain thousands of readers.

Knowing *what* to write is about half the battle. The other half is knowing *how*. To produce saleable articles, you must master the tools and techniques used by all successful professional writers.

You might develop these skills on your own through sheer blood, sweat and rejection slips. But when I look back, I can't help thinking of all the time and agony I would have saved if I could have found a real "pro" to work with me.

Such help is now available to beginners everywhere through the Famous Writers School – founded by Rod Serling, Faith Baldwin, Bruce Catton, Bennett Cerf, Max Shulman, Mignon G. Eberhart, Bergen Evans, Red Smith, John Caples, Rudolf Flesch, Mark Wiseman and myself.

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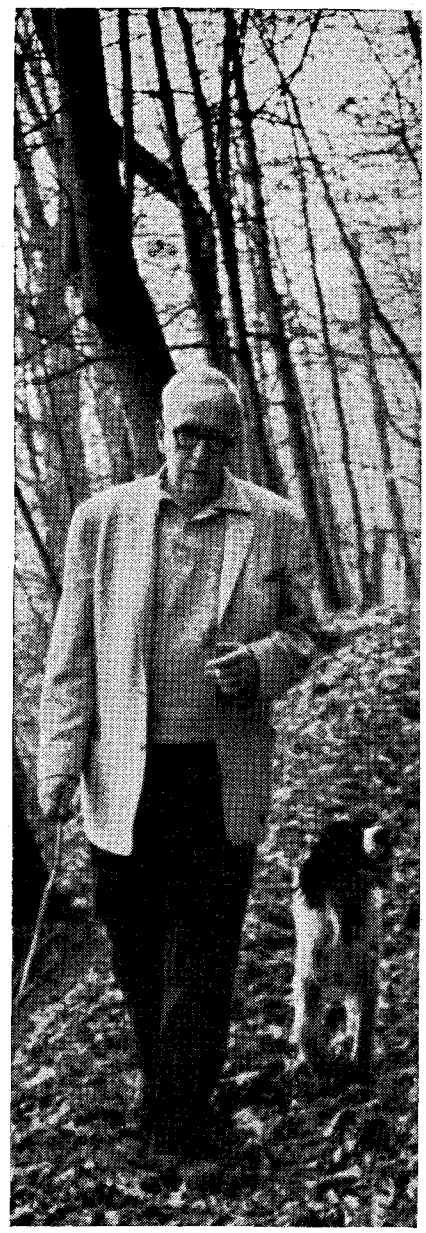
J. D. Ratcliff and the other Famous Writers have designed a revealing Aptitude Test. The coupon will bring you a copy, plus a 48-page brochure about the School. When you return the Test, it will be graded without charge by a member of the instructional staff. If you do well on the Test – or offer other evidence of writing aptitude – you may enroll for professional training by the School. You are, however, under absolutely no obligation to do so.



"Jack" Ratcliff on a typical afternoon stroll through the New Jersey woods, where he conceives many of the articles that prompted *Time* to name him "America's No. 1 craftsman in the field of non-fiction." Although he writes no more than four hours a day, he has had over 100 articles published in the *Reader's Digest*, and hundreds more in such magazines as *McCall's, The Saturday Evening Post* and *This Week.*

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"HYPERINFRACANIPHILIA"

an editorial by John W. Campbell

You won't find that term in any dictionary that I know of, nor any textbook on psychology, but I think it's a term needed to describe one of America's most widespread neurotic tendencies. It means "having a neurotic and excessive fondness for the underdog," without having the slightest interest in finding out why he is in the infra position.

For example, let's consider the poor people that great "war against poverty" is supposed to help.

Now I've been looking into the situation of a group of people in one area on the fringe of that Appalachia region who have some very tough conditions to contend with. Their region is very backward, very underdeveloped, and astonishingly underindustrialized. The people in that area aren't able to buy tractors, and have to do all their farming—most of them are farmers—entirely by their own hard work. They don't even have electric power, and hence no electric lights or power-driven equipment. Of course that also means no radio or television for relief, during the long evenings, from the hard work of their living. Their children can't go to the public schools. They don't have automobiles to get around in, but travel by horse and buggy. These poor people . . .

Oh, you know about the Amish people, huh? You've seen their beautiful, lush farms, their big, sturdy barns and their spotlessly-kept homes? Well, I know they almost universally have good, fat bank accounts, but aren't they "poor people" in that they don't have the conveniences of modern life?

Well, what *do* you mean by "poor people"? Perhaps you mean "poor" in the sense of "genetically incompetent, lacking the qualities of intelligence, ambition, self-respect and determination necessary to adequate accomplishment." Certainly the Amish aren't "poor people" in that sense; what they have proven a man—and this does, of course, mean he has to be a *man*, not a whimpering bum—can accomplish with his own muscles, using intelligence, determination, and willingness to work adequately demonstrates that they aren't "poor" genetically.

The next time some victim of hyperinfracaniphilia tells you how this, that or the other group or individual "didn't have a proper chance," it may be appropriate to compare the situation of the named group or individual with the standard Pennsylvania Dutch situation. What would have happened to an Amish family dropped into the situation? Would they be living in a leaky shack, in ragged clothes, unwashed, ill-fed, and penniless?

Take a run through the areas full of those "poor people," look at the tumbling shacks, slovenly men and women, the TV antennas decorating every ill-patched roof, the fairly late-model automobile standing in the ruts across the grassless lawn—and not so much as a well-tended vegetable garden in the empty acres of land. They've got electricity, TV, a car . . . and are ill-clothed, ill-fed, and ill-housed in an area where there's acres of unused land.

Oh, it's poor land, that won't raise good crops?

You can't teach those people anything useful, so it would be useless to import some Scottish farmers, men accustomed to farming barren, treeless hillsides, with soil leached of practically all plant nutrient by the nearly ceaseless rains, with a growing season shortened by the fact that they're as far north as Hudson's Bay—and men *not* accustomed to whining about their hard lot.

You won't see any sheep on the hillsides in Appalachia, either, nor appropriate breeds of cattle. Sheep yield wool as well as meat, which, with a bit of effort, can be turned into excellent clothing—without the need for a major industrial complex. Ask your nearest librarian.

There is a great deal of talk, too, about the selfishness of the better-off people, and the hyperinfracaniphilia type insists that we should help these poor people.

It is certainly true that those poor people are completely unselfish. No one can accuse them of having done anything for themselves, and isn't it held that the mark of selfishness is that you do things for your own interest?

How can you help people who are so unselfish that they practically never do anything for themselves? Of course you can rebuild their shacks, make

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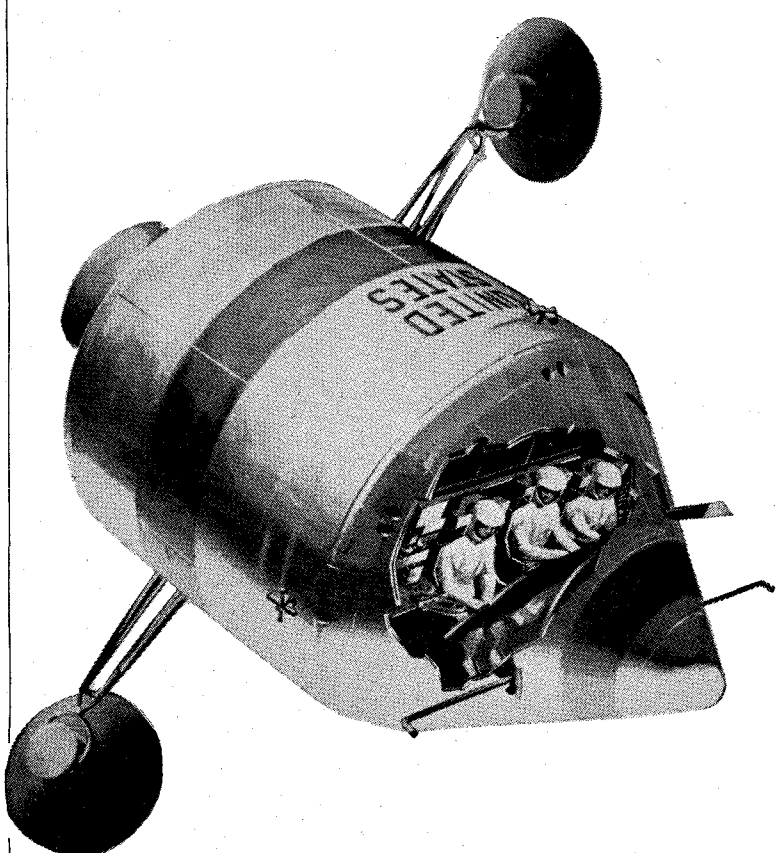
Program for Lunar Landings | Joe Poyer

As of October 1, 1964, the U.S. program for Lunar Landings was scheduled this way: When things don't work as expected, it gets slowed down. When Russia puts three men in orbit—it might get speeded up.

The essential difference between the U.S. and Russian approach seems to be that the U.S. makes magnificent little machines that work; Russia's don't work so good. (Last successful Russian instrument probe was the Lunik that took pictures of the far side of the Moon; all seventeen planetary probes Russia sent since failed.) But Russia builds big machines, and sends men along to keep the machines working—and at that, they've been terrific!

This article gives a detailed discussion of what the U.S. is planning; coming shortly is a companion piece describing the hundreds of tiny, deadly, unexpected things that crop up—the things nobody ever thought of. Like the man-killing floor tile, and the nontoxic, harmless refrigerant that nearly killed the whole crew . . .

We now know weightlessness has deadly effects even science-fictioneers never guessed at. But do you realize that no man has ever yet been out of a strong gravitational field? Do you know free-fall in a strong field is fully equivalent . . . ?



■ The level, pockmarked plain extended nearly twenty miles to the high range of rugged mountains almost hidden by the horizon. In the foreground, a series of silvery, half-buried domes glowed in the clear greenish earthlight. A tall radio mast pointed at the stars while bowl-shaped radio and radar antennae turned ceaselessly searching the sky. A spacesuited figure stepped from the underground air lock of the largest building and hastened to a tractorlike vehicle parked a short distance away. He climbed the ladder to the cab and disappeared inside. Moments later the tracked vehicle lurched and moved ponderously away from the base area and onto the plain.

A half mile from the base, the tractor jolted to a stop and the driver climbed out and began planting a series of radar homing signals and then moved the tractor back a few hundred yards and waited. Shortly, flash of misty haze appeared in the black sky, one thousand yards above the landing site. A squat configured, beetle-shaped landing craft bounced to a stop on its spidery landing gear.

Figure 1. The three-man Apollo Command and Service Modules are depicted orbiting the moon during a manned lunar orbit mission. This spaceflight will serve both to perform final checkouts of the Apollo system and to pinpoint the landing area visually. (Photo courtesy NASA.)

Figure 2. This photograph of the moon was taken by the Lick Observatory using the 36″ refractor telescope. The moon is about 25.4 days old. The dark area directly above the rayed crater Tycho, bottom center, is Mare Nubium, the Sea of Clouds and the landing site of Ranger 7. The smaller rayed crater to the left of center is Eratosthenes. The Ranger, Surveyor, and Lunar Orbiter spacecraft will further explore both landing and base sites. (Photo: Lick Observatory.)

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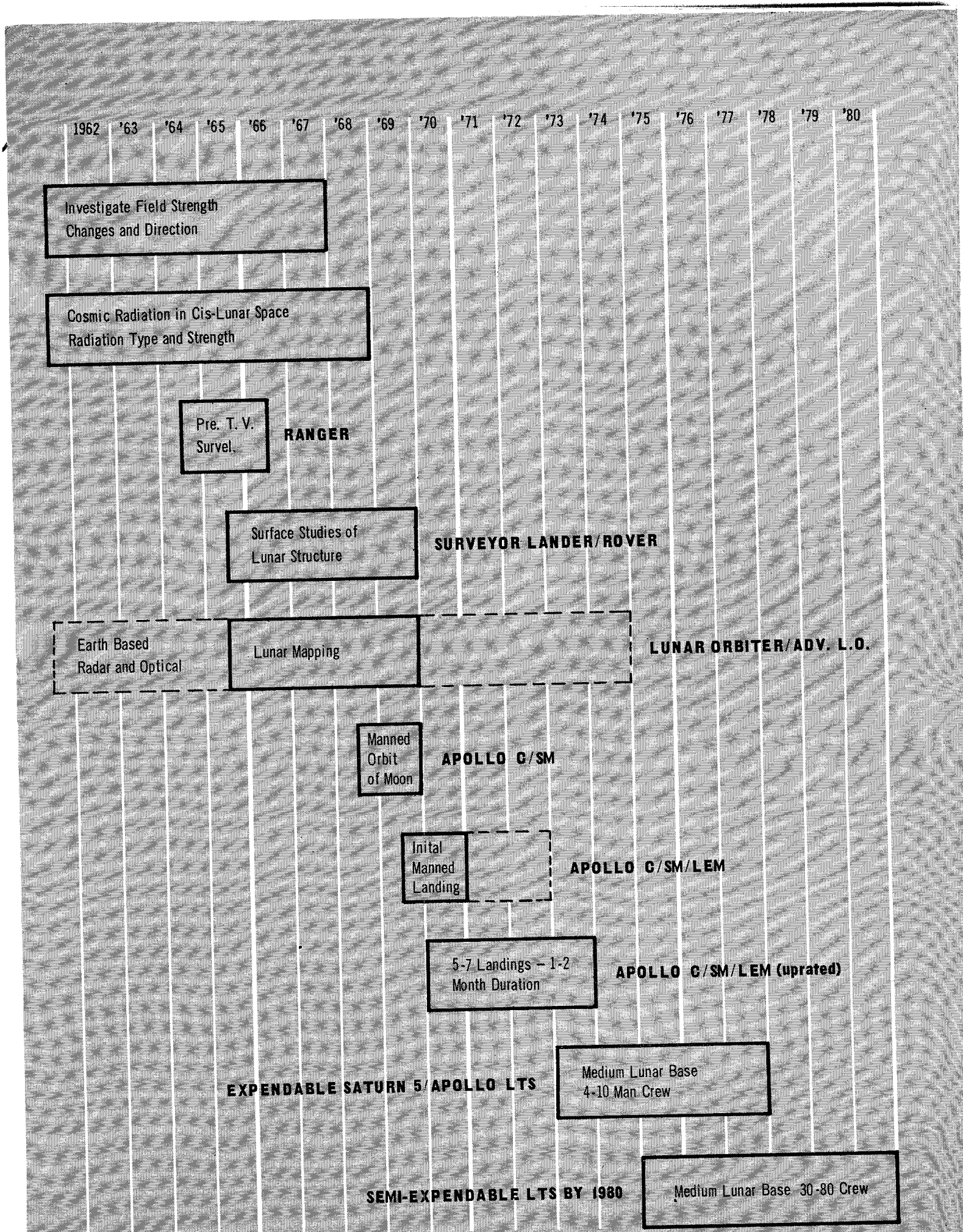

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The tractor moved toward the LEM vehicle and drew up alongside the bulbous canopy as the pilot clambered out. The two men exchanged greetings and began transferring the cargo to the lunar reconnaissance truck.

Above, in a tight fifty-mile orbit, the orbit-to-orbit ferry craft swung waiting for the shuttle to complete its unloading and return with personnel to be rotated back to Earth.

This scene could take place as early as 1975 and as late as 1980. This is the time period in which a medium-sized Lunar Base will be in operation. This lunar landing craft bringing supplies to the base is merely another in the line of spacecraft that will be required to develop the Lunar Base.

There are actually three distinct classes into which lunar spacecraft can be divided, reconnaissance, landing, and lunar logistics. The first includes the various spacecraft such as Ranger and Surveyor that will prepare the way for the manned landing by examining and testing this new environment. The second contains the Apollo spacecraft that will make the first manned landing on the moon's surface. The third class will support and supply the Lunar Base that will surely spring up as man's curiosity is piqued by this new and strange planet.

To establish a base on this sister planet of ours will require the most extensive exploration program ever before conceived by man. Already, midway through the 1960s, a good portion of this programming is nearing completion. We will have landed on the moon by the turn of the decade or shortly thereafter in keeping with the late President Kennedy's plan. But the landing is only the beginning. A base containing scientific and technical personnel deeply absorbed in the mysteries of Luna and its relationship to Earth will rise from the first few landings. Saturn 5/Apollo is not the end of the Lunar program but merely the beginning, Figure 3.

Figure 3. This chart shows the time span, 1962-1980, with the operational years of the various spacecraft required for the lunar exploration and base programs.

Lunar Reconnaissance Missions

A direct and very necessary prelude to an attempt at a manned lunar landing in Project Apollo are reconnaissance flights that must be carried out to gather sufficient data about the surface features and general environment of the moon. Specifically, detailed photographs of the area of the lunar surface which the Lunar Excursion Module, LEM, will pass over must be obtained and compiled into maps for the two first astronauts to step onto the moon's surface and for future exploration teams. Figure 2.

This important detailed cartographic data can only be obtained by a vehicle orbiting the moon at low altitudes in spite of the excellent success of the recent Ranger 7 shot. Necessary data about the surface composition can only be obtained by a soft landing vehicle relaying the results of simple chemical and geological, or rather selenogical, test to earth. Figure 3 details in diagram form the successive missions that must be accomplished preparatory to the manned lunar landing. To date, only three specific vehicles have survived four years of plan changing and re-evaluation and have been designated to obtain this information; Ranger, Surveyor, and the Lunar Orbiter. All three of these are relatively small, unmanned probes, yet designed to gather more data about the moon in a few brief flights than has been learned since Ugh, the caveman stumbled from his cave to puzzle over the shiny "eye in the sky."

Ranger: Ranger is a 700 to 800 pound spacecraft, launched by an Atlas/Agena directly toward the moon and then, either fly-by or impact on the lunar surface. Ranger will gather general scientific data about the moon and the intervening cislunar space. During flights in which Ranger is programmed to impact the moon, a series of television cameras will take literally thousands of pictures in the last few minutes before impact and relay them to earth-based tracking stations. Later Ranger flights will eject instrument capsules onto the surface which will continue to relay information. For midcourse correction, Ranger carries a small rocket motor which can in-

Figure 4

RANGER 6-9 DETAILS

Subsystem	Weight	Remarks
Structure	94 lbs.	Aluminum Alloy Structure, Cast Aluminum, or Magnesium Equipment Boxes
Guidance and Control	72	Transit: 3 axis space stabilized, sun and Earth references Mid-course and terminal: Gyro reference Attitude control; nitrogen gas jets
Telecommunications	61	L-band (960 mc), 3 watts
Power supply	164	Solar panels: 180 watts unregulated batteries, 2,400 watt hours, silver-zinc
Propulsion (Midcourse)	45	Midcourse motor: Anhydrous Hydrazine; 50 lbs. thrust
Television	371	Six one-inch vidicons (Best Resolution 1 meter) Two transmitters, 60 watts each. L-band (960 mc) Power: Batteries, 2,700 hours, silver-zinc
Total weight	807 lbs.	

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PROGRAM FOR LUNAR LANDINGS

Figure 5

SURVEYOR DETAILS

Subsystem	Weight	Remarks
Structure	179 lbs.	aluminum tubing, cast magnesium equipment boxes
Guidance	69	Transit: 3 axis space stabilized: sun and Canopus references, rate gyros Midcourse maneuvers: Strapped-down gyros in inertial reference system (autopilot) Integrating accelerometer Terminal descent: Altitude marking radars, radar altimeter and doppler velocity sensor autopilot, analog computer
Control	17 (included in propulsion)	Transit: Nitrogen gas jets (Mid-course maneuvers: vernier engines) (Terminal descent: vernier engines)
Telecommunications	46	Frequency: 2,295 mcps power: .1 watts and 10 watts band width on high power 1 to 220 keps
Power supply	66	Solar panels: 88 watts Battery: 3,000 watt hours silver-zinc/ potassium hydroxide
Propulsion	1,536	Main retro rocket: solid spherical, 36 inch diameter. Vernier engines: MMH/N_2O_4 3 capable of 30 to 150 lbs. thrust each
Spacecraft wiring	45	
Experiments	115	8 experiments: Television cameras (3), soil mechanics, surface sampler, X-ray diffractometer, touchdown dynamics, (Alternate experiments-seismometer, alpha part. scattering)
Total weight	2,100 lbs.	

Figure 6

LUNAR ORBITER

Subsystem	Weight	Remarks
Structure	—	Undefined
Guidance	—	Undefined
Instrumentation	116 lbs.	Telemetered film photography, Selenodesy, Environmental measurements
Power	—	245 watts (Max.)
Stabilization	—	3 axis
Design Life		Six months to one year. One month photography
Trajectory		Eccentric Lunar orbit
Total Weight	819 lbs.	

crease the vehicle speed by 178 feet per second.

To date, the first six Ranger shots have failed. Ranger 7, launched July 28, 1964 was an unqualified success, relaying valuable first closeup photographs of the moon's surface in the region of the Sea of Clouds.

Ranger is a minimal probe of limited capacity. A series of nine shots are currently programmed but the number may be increased. Ranger, however, will shortly be phased out in favor of the larger and more versatile Surveyor. Figure 4.

Surveyor: The Surveyor Lander is a 2,100 pound spacecraft launched into a translunar trajectory by the Atlas/Centaur and designed to soft land on the moon. Surveyor will have sufficient propulsion on-board for mid-course corrections, retro-thrust near the moon, and a "soft-landing" on the surface.

Depending on the performance capabilities of the Atlas/Centaur when it becomes operational, Surveyor will weigh from 500 to 900 pounds of which 115 to 300 pounds will be payload consisting of scientific and selenogical equipment. Among later payloads in the program, will be several roving vehicles that will leave the immediate impact areas and travel specified distances to gather more data. Several designs for this vehicle are now under consideration.

Surveyor was originally scheduled for flights beginning in late 1963. However, difficulties with the liquid hydrogen-lox fueled Atlas/Centaur booster have delayed the Surveyor program into early 1965.

Again, Surveyor, like Ranger, is a minimal vehicle for its mission, but, due to the imminent approach of the manned lunar landing program, Surveyor Landers will in all probability, not be replaced by a better system. Surveyor landings have an excellent chance of continuing up to the first landing of Apollo, Figure 5.

Lunar Orbiter: Basically, the same Surveyor vehicle, the Lunar Orbiter hardly resembles its parent craft

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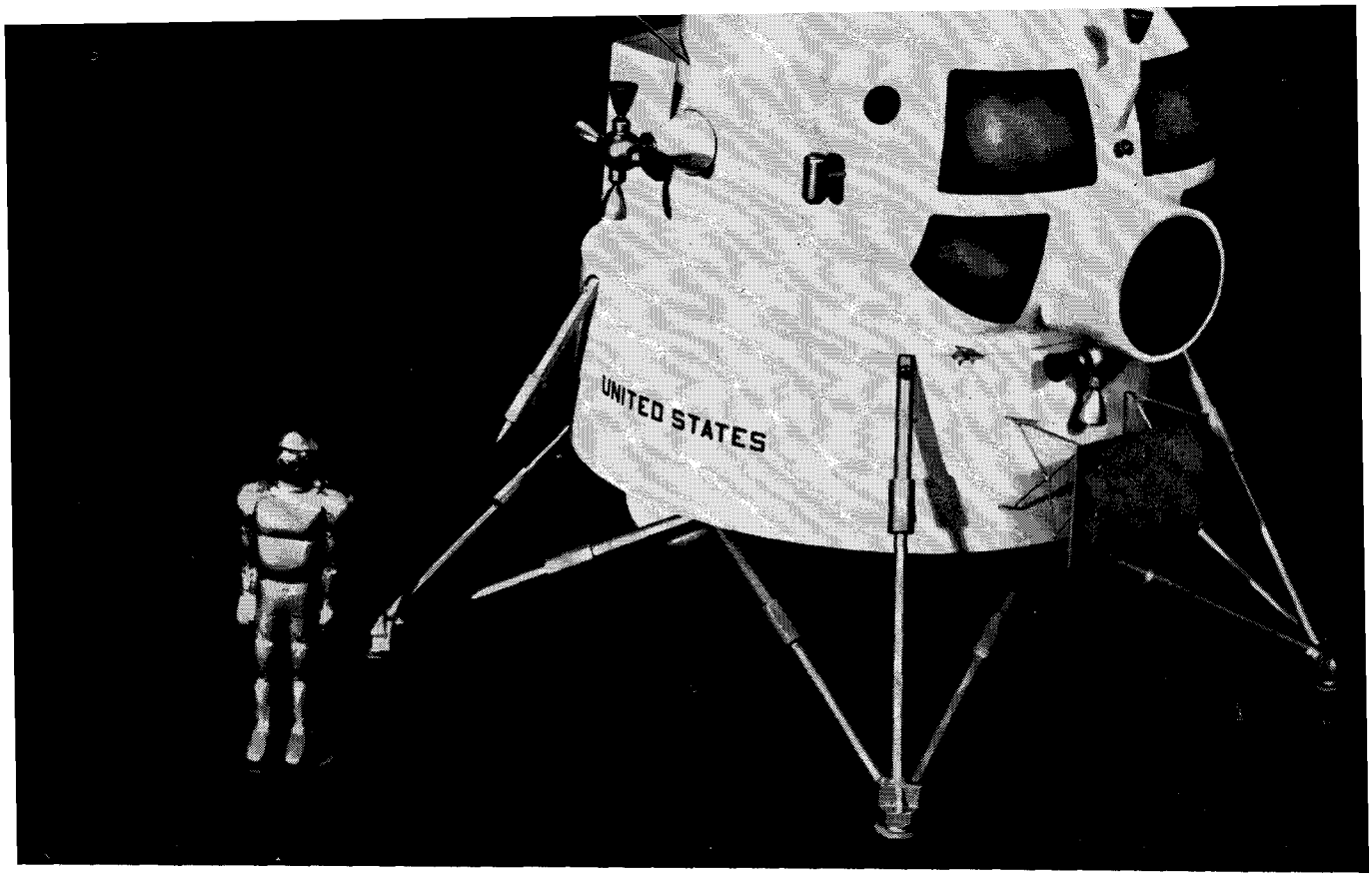

Figure 7. The Lunar Excursion Module is shown in comparison to the spacesuited figure at left. Note the two air locks, one at the top of the craft for entrance and egress from and to C/SM while in orbit, the other, in the center of the canopy, allows the astronauts to leave the spacecraft on the Lunar surface. (Photo courtesy of Grumman Aircraft and Engineering, Corp.)

either in mission or design. Surveyor Lander is designed to soft land a payload on the moon and therefore requires much equipment, extra propulsion, landing gear, landing radar, etcetera, that would not be needed by the Orbiter. If the Lunar Orbiter vehicle weighed overall, 819 pounds, as much as 400 pounds could be devoted to useful payload in lunar orbit, Figure 6.

There are several considerations that must be taken into account in the development of this craft; the current budgetary situation, the fast approaching manned lunar landing, and the launch vehicle needed to send the Lunar Orbiter on its way. As programmed at the moment, Lunar Orbiter will be launched by the same Atlas/Centaur booster that will power the Surveyor Lander.

It is entirely possible that this Lunar Orbiter craft may develop into a 90,000 pound vehicle which would be launched by Saturn 1B into a low lunar orbit for detailed cartographic studies. This type of vehicle would have the additional advantage of being readily adaptable for soft lunar landings, depositing as much as 1,500 pounds of useful payload on the moon surface. This lunar vehicle could carry any of seven types of payloads, as currently specified by NASA, one of which would be a large roving vehicle.

Again, we must take into account the usual nemeses of R&D projects, time and budget. There is serious question as to whether or not this uprated vehicle could be developed in time to be useful to the manned lunar landing. This advanced Lunar Orbiter would have to be operational by 1967 at the latest, here, providing the manned lunar landing goes on schedule in the 1969-70 time period, for the data gathered to be incorporated into the planning and design of the Apollo mission. If for some reason, technological or political, the manned lunar landing should slip beyond 1970, this advanced vehicle would

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PROGRAM FOR LUNAR LANDINGS

almost certainly be incorporated into the lunar reconnaissance program.

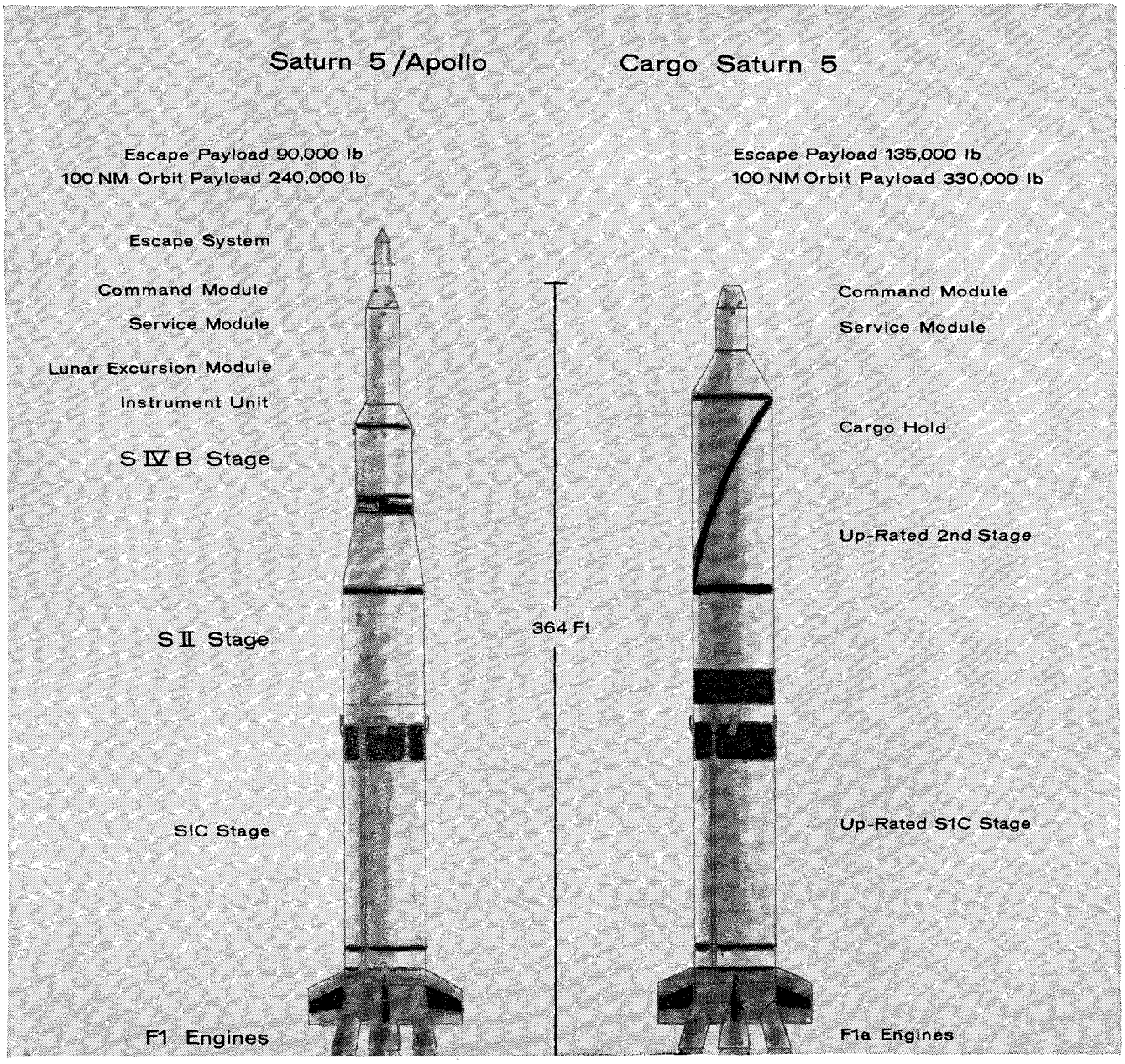
The entire lunar landing project is beginning to feel the political pinch of budgetary considerations. Funds almost certainly would not be allotted to the development of an advanced lunar reconnaissance vehicle unless the above considerations were met and unless the manned lunar landing slipped past 1970.

Finally there remains the possibility of using the Apollo Command and Service Modules, C/SM, to perform the final detailed reconnaissance of the moon and the programmed landing area. To augment the Apollo reconnaissance flight, an unmanned LEM could be landed on the surface carrying a payload of scientific instruments large enough to perform most of the necessary reconnaissance functions in one mission. There are serious drawbacks to this as I will point out shortly.

NASA has programmed a manned lunar orbital journey for the Apollo C/SM prior to attempting a manned lunar landing. Certainly final details and maps of the landing site will be accomplished during this flight as well as performing a final check on the now man-rated Apollo system. The information gathered will serve to pinpoint the landing site exactly, and perhaps even drop a radio or radar homing device, and to catalog minute details of the topology of the surface.

As to using an unmanned LEM to gather reconnaissance data, LEM

Figure 8. Artists comparison of the Saturn 5/Apollo and projected Cargo carrying Saturn 5. The rise in payload weights can be accomplished by uprating the basic Saturn 5 launch vehicle.



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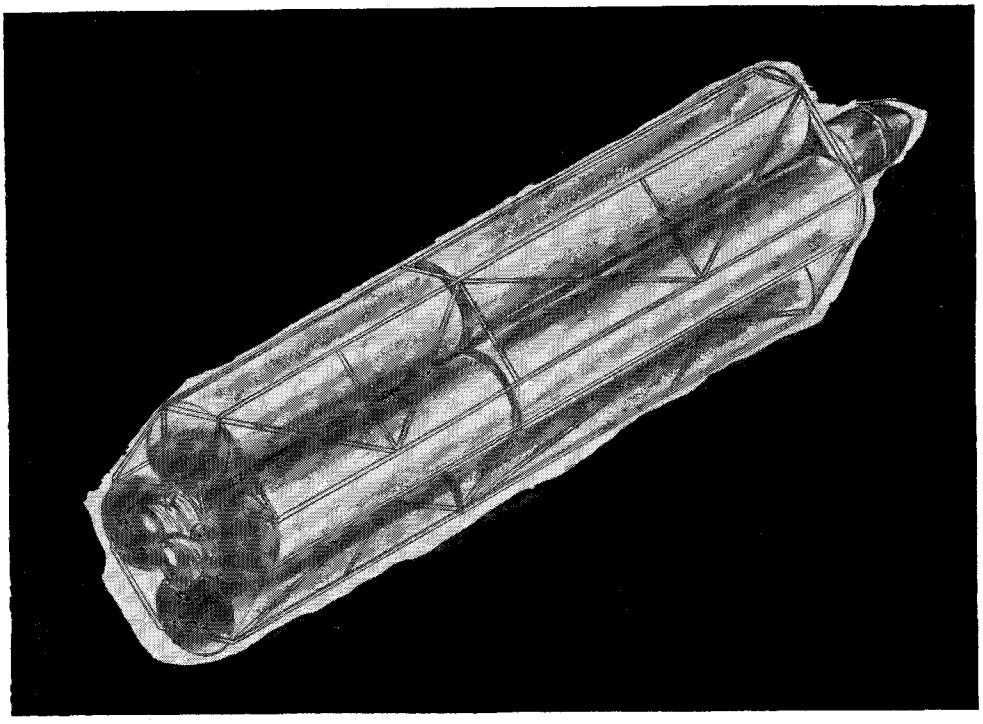

Figure 9. Artists conception of the Lunar Transportation System Orbit to Orbit shuttle enroute to the moon. The spacecraft carries eight fuel tanks that can be dropped during flight, thus devoting more weight to payload. In addition to cargo and personnel, the Orbit to Orbit shuttle must carry fuel for the cargo LEM which is based on the moon.

requires the Saturn 5/Apollo system to reach lunar orbit. A crew must also go along to remove the LEM from its in-flight storage compartment behind the C/SM and position it for the landing on the moon. All of this requires that the Saturn 5/Apollo/LEM be man-rated. If we wait until the Saturn 5/Apollo/LEM is man-rated, which will not be until 1968-69, just before the circum-lunar and lunar landing trips, any data gathered by LEM will be useless to incorporate into the design and planning of the system.

Again, another possibility is to launch the LEM, using the Saturn 1B for a soft landing on the moon. Saturn 1B has sufficient thrust to place the LEM into a translunar trajectory, however, the way the scheduling of the various components of the manned lunar landing project is set up, LEM will be ready at about the same time as the Saturn 5/Apollo.

The foregoing serves to point out that unmanned lunar reconnaissance, cartographic, selenogical, and other pertinent studies must be accomplished while there is still time to incorporate the data into the lunar landing program—and this means by 1967 at the latest if the manned lunar landing is to maintain its scheduled 1969-70 landing target date, from the reconnaissance standpoint at least.

There is a basic qualification for the lunar reconnaissance program and that is generally thought to be that lunar reconnaissance craft will have no further use after Apollo becomes operational and the manned lunar landing is accomplished. While many cartographic and selenogical studies can and will easily be accomplished from a manned orbiting Apollo craft and human exploration, the moon comprises a pretty vast area that certainly will need to be mapped thoroughly. During the early 1970s, while the lunar base is being established, there will not be time or spacecraft available to concentrate on this project beyond the immediate landing area and the near vicinity of the first lunar base. Orbiting unmanned craft could cheaply and efficiently complete this particular task. Therefore, it may be likely that uprated versions of Surveyor may have a place in lunar exploration extending well into the 1970s, rather than ending with the first manned landings.

What is learned about the moon by these unmanned reconnaissance flights is of the utmost importance. It might be well here, to survey the possibilities of several findings about the moon and their effect on the manned lunar landing program.

There are essentially four major findings that could affect the program:

1) Reconnaissance missions will show the surface to be "landable". Areas exist where the weight of the LEM will be supported and where no serious dust problems will arise.
2) The reconnaissance missions will show that it is impossible to land for various reasons. Thin crust, quicksandlike dust, dust clouds raised by braking rockets that would make the landing hazardous, et cetera.
3) The data gathered by the reconnaissance vehicles will not be sufficiently conclusive to allow or cancel or delay the manned lunar landing program.
4) The reconnaissance vehicles will uncover some aspect of the moon which will make it unattractive as an object exploration, exploitation and/or colonization.

Possibility 1 is considered the most likely occurrence, so much so that the entire 20-to-40-billion dollar program is based on its assumption. This again points out the necessity for thorough reconnaissance.

Possibilities 2 and 4 are considered to be the most unlikely. If one or both should occur, they would serve to cancel, or at least, delay for years the entire manned lunar landing. The project would then have to be rechanneled.

If possibility 3 occurs, then it will be necessary to delay the manned lunar launching and continue with more detailed reconnaissance until it is established whether or not the manned lunar landing can be made.

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If this should prove to be the case, we then have an opportunity to use the advanced Saturn 1B boosted reconnaissance Orbiter or, even more likely, a landing using an unmanned LEM, preceded by extensive low orbit reconnaissance from an Apollo/C/SM carrying two crew members with the third replaced by cameras and other necessary scientific equipment. This would naturally delay the manned lunar landing effort into the middle or late '70s.

Out of this grows another possibility. If the manned lunar landing is delayed past the early '70s, the emphasis will almost surely shift to some other aspect of our space program and most likely it will be the manned space station. If the lunar effort is delayed long enough, we may find that the moon will be bypassed to a great extent, a series of space station programs will replace the lunar program and our attention will shift to the other planets. As I say, this is only a possibility, but then the universe is full of possibilities, only one of which is the lunar landing.

To summarize, the optimum sequence of missions to be performed up to the manned lunar landing is as follows: Ranger, impact and flyby; Surveyor Lander and Lunar Orbiter; followed by a manned Apollo C/SM orbit of the moon and finally the lunar landing by 1969-70. All, of course, depending on no major technological, funding, political or hostile environment delays.

The Manned Lunar Landings

The details of Project Apollo and the actual manned lunar landing are fairly well known by now. Briefly, the 88,000 pound Apollo Command and Service modules plus the S-4B—the third stage of the Saturn 5—will be launched into earth orbit by the Saturn 5 booster from Cape Kennedy. At the proper moment in its orbit, the S-4B stage will fire to "kick" the Apollo C/SM/LEM into a translunar trajectory. The S-4B stage will then be jettisoned. Now the three module Apollo craft, weighing 80,000 pounds without the escape tower and adapter, will begin its two and one-half day coasting trajectory to the vicinity of the moon, Figure 1.

As the spacecraft follows its assigned trajectory, mid-course corrections will be made with the S-4B 21,000 pound thrust, restartable engine which can provide up to 300 feet per second added velocity during this period. As the C/SM/LEM approaches the moon, this same engine will provide the needed retro-thrust to put the spacecraft into lunar orbit.

Now, while the C/SM remains in lunar orbit with one crew member aboard, the other two astronauts will enter the LEM, which they have previously positioned while in the coasting stage, and begin their descent to the lunar surface. The LEM will drop away slowly, heading for the touchdown point. The pilot will use the LEM braking rocket to drift the vehicle specified distances in any direction to pick the best landing area.

One at a time, so that one astronaut remains always in the LEM, the men will explore and collect samples on the moon's surface in the few brief hours of their first stay. No attempt is to be made on this first trip to establish any kind of a lunar base. Finally, their mission complete, the two astronauts will blast the LEM from the moon into lunar orbit and rendezvous with the C/SM; the LEM will be left in its lunar orbit, Figure 7.

The C/SM, using the rocket engine in the latter, will enter a trans-earth trajectory and begin the return coast of 2½ days to earth. After the C/SM attains its precise re-entry trajectory, the Service module will be jettisoned and the Command module will make a nearly ballistic, supercircular re-entry, landing somewhere in the Pacific.

Five manned Apollo landings are now programmed for the 1968-1971 time period. The fifth is envisaged as a one-week stay on the moon prior to which early lunar base supplies will have been deposited on the surface.

Lunar Transportation System

Before the manned exploration of the moon can get underway seriously, one major question should be answered. How long can we rely on the Apollo system for the transportation of men and supplies to and from the moon? The long-range establishment and maintenance of a lunar base will depend upon the development of a fairly inexpensive, reusable system, which Apollo certainly is not. There are eight stages involved in Apollo; three Saturn 5 booster stages, the Apollo Command module, the Service module, the LEM descent and ascent stages, and the escape tower, all of which are good for only one mission, Figure 8.

In addition, each stage is highly specialized and capable of performing only the mission programmed. The Command module is specifically designed as a re-entry body. Its only other practical use might be as a ferry-tender for a manned earth orbiting space station. The Service module is used in conjunction with the Command module and then only for the lunar mission. Any other mission utilizing the Command module would require an entirely new service stage, and LEM, by its very nature, is an impractical vehicle to use in a Lunar transportation System as it is good for only one trip.

Apollo can most certainly be improved—an increased payload can be gained by using high energy propellants and eventually, the RIFT nuclear upper stage—but it does not lend itself to a reusable lunar transportation system.

On the basis of the foregoing, it is clear that, by the early 1970s, one of the following two situations will exist:

(1) Due to reconnaissance missions performed before the manned landing, the surface is found to be unlandable; so manned Apollo orbiters and unmanned surface probes continue during the early '70s. No manned landing expeditions would occur during the early or mid-1970s at least, and

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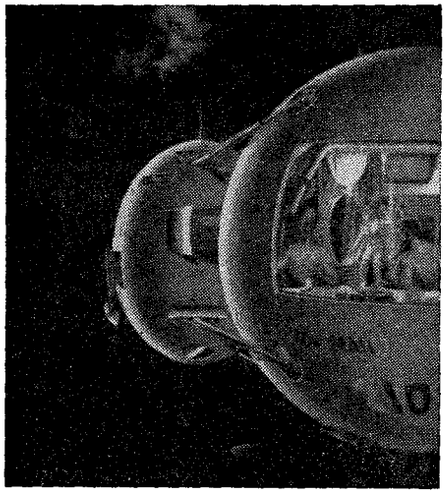
THE MAILMAN COMETH



Life, they say, is made up of a multitude of little things. Hm-m-m and so are debacles!

RICK RAPHAEL

Illustrated by Walter Hortens

"Thar she blows, Cap'n Ahab," Steve Prescott cried, "stand by your harpoon." The tiny blip arced across the corner of the scope screen. Steve switched scan to the next range and punched for a computer reading. "By the mark, a deep two hundred and twenty thousand miles, sir," he reported.

Across the main cabin, the lanky, dark-haired and dark-bearded youth stuffed the last bit of a peanut butter and jelly sandwich into his mouth and ambled over to the scanner. Like Prescott, Brian Aldridge was stripped down to a pair of filthy khaki shorts and house slippers. The slippers were his only concession to fastidiousness. "There's just something nasty," he maintained, "about stepping barefooted into an old blob of jelly on the deck."

The blip on the screen continued to bore in towards the bull's-eye that marked the position of Orion Sub-Station One, Galactic Postal Service. Brian peered over his partner's bare shoulder and watched the blip's passage. He licked his sticky fingers and absent-mindedly wiped them in his shaggy beard.

"That monster is a good fifteen minutes away," he muttered. "How many times must I tell you, Mr. Christian, that I am not to be needlessly disturbed from my meals and meditations?"

"Sorry, sir," the blond young giant at the scanner replied with a grin, "I'll have myself flogged immediately." Without taking his eyes from the scanner, he reached up and seized a gangbar handle above the console. "Air lock auxiliary power coming on." The

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deck beneath their feet vibrated with a slightly different resonance. Steve pulled his hand away from the handle and regarded his grimy palm and the equally grimy gangbar handle with disgust. "We got any water to wash that thing off, Brian?"

"Your paw or the handle?" Brian asked idly.

"Both."

"I dunno," the bearded youth said as he shuffled out of the cabin, "Jupiter Pluvius was on strike again this cycle. I'll see if he's in a more generous mood."

Brian scooted down the passageway in a floating shuffle that was best adapted to the sub-station's one-third Earth gravity. He turned into the big hydroponics life-cycle chamber and picked up a plastic bottle from a rack beside the door. One wall of the chamber was banked with growing plants of several varieties—plants that supplemented the two-man team's diet with fresh fruit and vegetables and maintained the oxy-cardox cycle for the station. Another side of the chamber contained the water recycling system and below that bank of condenser coils and purifying filter, a pair of taps were aimed at a small sink. The sink, its adjacent counter and a small table jutting out from the counter were piled high with dirty eating utensils, soiled clothing, and unwashed hydro gear.

Brian stuck the mouth of the bottle under one of the taps and turned the valve. Nothing happened. "Come on, Jupe," he growled and pounded on the recycler panel. A thin trickle of liquid dribbled into the bottle, then dwindled to an occasional drop. Brian banged on the panel another moment and then sighed. "I'll have to clean you out after the mail is sorted, Jupe," he said eying the recycler. He turned back to the control room where Steve was recomputing the approach path of the mail missile.

"Jupe's still on the blink," the bearded one reported. "I'll have to clean out his filters after we sort the mail. How can any twenty-four-year-old idiot be moronic enough to try and make beer in the water recycler?"

"My recipe would have worked fine," Steve replied without looking up from the scanner, "if you hadn't decided to add honey to the mess and change the brew into mead. Any coffee left from breakfast?"

"Half a cup, maybe."

"It's better than jelly," Steve said. "Pour some on a rag and wipe off this grip, will you?"

Brian glanced at the scanner. The robot rocket blip now was inside the final fifty-thousand mile range and closing fast. "I'll do it after we lasso this baby," he replied. He slid into the seat next to Steve and punched on the tractor scope, then grasped a pair of wobble knobs protruding from the console top. "Range?" he demanded.

"Sixteen thousand, five," Steve called.

"Vector?"

"Oh seven nine."

Brian's hands moved gently and the orbiting station wheeled slowly. It continued to turn until the still-sealed transfer hatch door was aimed in the general direction of the approaching unmanned mail ship.

"Looks like a good one," Steve said as he plotted the closing course.

Whipped from station to relay to station across light-years of sub-space on Englemann Drive, the robot carriers were programmed on course and contained internal computers for fine course correction. But fine, unmanned plot was considered fantastically accurate if it could hit somewhere on a planet. Since this had the dual undesirable side effects of demoralizing planetary populations and further, vaporizing the microfilmed mail, it was necessary to intercept the robots in space. Early mail deliveries had been tried on a direct planetary landing basis. Much of the mail went undelivered, missing the destination by anything from ten thousand miles to as many light-years. A few actually were trapped into docile orbits and landed. Several more made direct approaches. Galactic Postal Service later referred to the latter as "To Whom It May Concern" mail. This, too, was abandoned in favor of the orbital sub-station.

Postal Service maintained the sub-stations throughout the constellations and systems touched by the space-flung spores of humanity. The robotic programming plus the internal corrective computers had much improved the plots of the mail ships but they still could be as much as ten thousand miles out from a station at the nearest conjuncture. Powerful tractor beams were used to lock onto the drifting vehicle and haul it into the station. There, the mail would be shifted to planetary shuttle carriers for the shorter terminal legs or transferred to other sub-space carriers headed to different galaxies.

The inbound mail ship arrowing towards Orion One would drift by less than four hundred miles out.

At three thousand miles, Steve locked the command beam on the approaching craft. Computer-controlled command circuits took over and at the proper moment a signal went from the station to the ship. Retro plasma-jets fired and the mail rocket began braking to match velocity with the station.

A red light came on above Steve's scanner. "Braking," he said to Brian, "you may fire when ready, Gridley."

Twin tractor beams lanced out into space and glued to the hull plates of the robot. The craft visibly slowed as though it had suddenly plowed into the sea of molasses. The tractor beams held it steady and then brought it to a halt in relation to the station. Then the beams began hauling the robot to the transfer hatch. A few minutes later there was the familiar muted "clang" as the hulls met and the scraping sound of the robot rolling on its axis until magnetic lock plates on the station and the robot lined up the ship's loading port with the station transfer hatch. Mechanical locks took over the job of the tractor beams and the robot was ready to unload.

"The mailman cometh," Steve said, rising from his seat and shuffling to the door. He picked up an ancient,

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grime-crusted hat with a torn bill and crammed it rakishly on the back of his uncut and unkempt mop of hair. As he stooped to go through the low door the light glinted momentarily on a battered and almost smooth metal tag on the front of the headpiece. In the proper light and with careful scrutiny, you could make out the dim letters "U.S.Mail" pressed into the metal centuries earlier. The original cap had long since moldered away and the shield had been switched to other forgotten caps through the years. Prescott had stolen the cap and devise from the Galactic Postal Museum while he and Brian had been training clerks planetside.

The two half-naked men dropped down to the working level of the station and hurried to the transfer local. On either side of the sealed hatch were two large video screens and an array of control knobs. Each man activated his video scanners that peered into the brightly lighted but airless transfer chamber. Wordlessly they went to work, pressing buttons, manipulating controls. In the screens, they could see the out station hatch recess into the hull to reveal the still-closed robot carrier's outer port. A second later it, too, opened. From the floor of the transfer chamber a cargo carrier chute rose and extruded itself into the interior of the robot. More manipulations and lightly ice-rimmed tubular canisters began popping out of the carrier chute onto racks on the floor of the chamber. Inside each twenty-foot canister were a dozen more smaller containers and inside those were yet smaller cans of reels. Each reel of microtape held a thousand pieces of correspondence. A "mail pouch" can could hold the mail for an entire planetary population.

Now the floor of the transfer chamber was lined with the long canisters. The cargo chute was still nosed into the robot and on Brian's control panel, a relay began a regular clicking to the accompaniment of a flashing yellow lamp.

"Nuts," Brian growled as he flicked on a small video scanner mounted at the outboard end of the chute. The screen showed the retractoclamps of the chute grasping and slipping from the end of a canister wedged off-center in the loading rack.

"I've got a jam," he said. Steve looked warily at his partner. "So?" he inquired.

"So it's your turn to go out," Brian retorted.

"The hell it is," Steve snapped. "I went the last time."

"The hell you did," Brian said. "I went out when the Antaurus Three jammed and that was the last one. Now cut out the stalling. It's your turn."

"Oh hell," Steve muttered angrily as he turned to the suit locker, "if you're going to be so technical about it, I'll go."

He reached into the locker and hauled out an armored spacer rig. He shuddered slightly and then distastefully unlocked the front of the suit and crawled inside. Brian came over and swung the armor shut as the big blond activated the servomechanisms in the suit. Through the viewplate he could see Steve's face screwed up in disgust. Brian lifted a talkie set from the wall and slipped it over his head.

"It doesn't smell so bad if you don't use the heaters," he said helpfully.

The spacesuited Prescott lumbered to the passenger air lock.

"Big choice," he growled inside the suit, "stink or freeze."

He lifted his eyes to the green light above the air lock and then entered. The door cycled shut behind him. "All set?" Brian asked.

"Go ahead."

Brian hit a bank of switches and pumps began sucking air out of the lock back into the station. A minute later the light changed red and the outer lock door cycled open into the airless transfer chamber. In the viewscreen Brian saw a cloud of vapor *whoosh* out into space as the residual air in the lock escaped. Steve's suited figure lumbered into the transfer chamber and then vanished into the ship. A moment later the cargo chute scanner showed Steve's gauntleted hands tugging at the jammed canister. It came free and was sucked into the chute. The hands vanished and the chute clicked over to the next rack of canisters.

Covered with a fine ice-rime, Steve plodded back into the air lock.

"Why don't you just stay there?" Brian asked. "It's almost empty and you could unsuit when I close the hatch."

"Why don't you choke on that face foliage of yours," Steve snapped back. "I'm not staying inside this walking gas chamber one second longer than necessary. Close that lock and get me outta here."

Brian grinned and recycled the passenger lock. Warm air gushed into the lock and the inner door opened. Steve rumbled back into the chamber, condensed moisture steaming from his suit. Brian unlocked the suit and then gasped as he whiffed the gush of evil-smelling suit air.

"Boy," he gasped, "you are ripe!"

Looking slightly ill, Steve climbed out of the suit. "Man," he choked, "we've just got to do something about this equipment. It's bad enough when I can't stand your smell—but when I can't stand my own . . ."

"Cleanliness is next to godliness," Brian parroted.

"In this sty," Steve snorted, "that is definitely next to impossible."

"You, Mr. Prescott," said Brian, "are a volunteer. Nobody twisted your delicate little arm to make you join the Postal Service. And remember, 'Neither Meteors, Martians nor Matrimony shall stop the Galactic Postal Service from making its duly appointed rounds.' "

"Matrimony, ha!" Steve snorted. "Fat chance a normal human being ever has for matrimony in this orbiting

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garbage can. By the time I get off this bucket, Jeri will have been married and had six kids."

Brian moved to another control panel. "But think how rich you'll be, Muscles. With your kind of dough, you can buy happiness."

The bearded youth looked lovingly at the inner hatch control board on the wall beside the inner door. A life-sized tri-di cutout of a busty nude redhead had been plastered over the control panel. Brian had punched holes in the cutout for the control switches and handles. A pair of red door lock control knobs jutted out in the most unlikely fashion from the most logical places on the redhead. The effect was heightened by the engraved instructions on the knobs, "Twist clockwise to open."

Brian seized the knob and twisted.

The inner door to the now air-filled transfer chamber began recessing into a wall.

"Now why don't you sublimate your drives like I do with Zelda," Brian said, still twisting Zelda's knob. "Although I'm older than you, I have no intention of settling for one female at this point. Play the field is my motto." He patted Zelda and glanced around the sorting room. Other nude cutouts were strategically placed along the work racks and shuttle boards.

The racks of tubes from the carrier were feeding into a combination heater-canceling machine. Steve waited for the first rack to emerge.

"Older, are you?" he cried scornfully. "You know damned well that you're only two months and six days older than I am. Ever since we were freshmen, you've been giving me that seniority rap. Why, you even pulled it on the Service to get lead man on this scow. Just so you could lord over me." He shoved the rack against a sorting table and slammed a lever on the side. The rack rose to bench height and the canisters began feeding into a conveyor tube.

Brian was right behind with another rack. In a matter of minutes, the transfer chamber was empty and the sorting benches jammed. Brian again gave Zelda a twist and the inner lock closed. The empty stellar carrier was moved to a storage mooring position away from the transfer hatch.

Side by side, the two young mail handlers began their swift breakdown of the many canisters.

This was their seventh standard month aboard Orion One and there were five more to go until relief. A supply ship sped out from District headquarters on Specia every month and stayed only long enough to unload a meager cargo of supplies for the two-man team, then vanished into sub-space to make stops across the system at other sub-stations. This was their only contact with humans during their year-long tour.

Classmates and fraternity brothers since the first day of university on Rigel's fourth planet, Tanus, Brian and Steve were just enough alike, yet perfectly dissimilar to make a working team. With their diplomas in hand—Brian with a B.S. in Psychomechanics; Steve with an Astrophysics B.S.—they had applied for orbital duty with Postal Service. It wasn't that their education or inclination had led them to the Regional office. It was something far more basic, far more significant—money.

Locked inside an hermetically sealed, electronic mailbox in space for twelve months, snaring and servicing fourteen inbound robotic stellar carriers each period and breaking the mail down into planetary shuttle carriers and occasionally fending off a bull's-eye carrier, didn't make for optimum employment conditions. To get men who were capable, compatible and willing, Postal Service paid premium wages. A year in the Service aboard a sub-station would net the human mail handlers three times the credit Brian and Steve could hope to command as top starting salaries in their chosen fields. A year was all they planned to spend in space.

Tall, blond and muscular Steve had lovingly and lingeringly kissed his fiancee good-by. Brian had been just as ardent in his farewells to a dozen girls, none of whom had been able to lay claim to more than a few moments of his life.

The pair worked swiftly, with an occasional glance at the chrono above the sorting racks. Most of the big canisters had been re-routed at their origin stations and only needed to be shifted intact to a shuttle carrier that would carry them to a terminal planetary breakdown station. Conveyor tubes led away from the sorting chamber like a network of blood vessels, leading to shuttles poised in launch racks along the periphery of the station. As quickly as the shuttle for Bethel was automatically loaded, the station's computer set a course for that planet and the shuttle was shunted away from the station then switched to plasma drive for the relatively short jump to its destination.

Each stellar carrier brought several mixed canisters and these had to be opened and the smaller tubes re-sorted for the proper shuttles. In some cases, even single microtape reels had to be juggled.

Brian popped open a mixed canister and began flipping the smaller containers into their proper routing hoppers. He slammed them about almost without looking, breaking the rhythm only to set aside an odd, smaller mixed mail can.

"I'm hungry," Steve said. "We gonna have time to eat a proper meal before the Taurus carrier gets in?"

Brian glanced at the chrono and shook his head. "Nope, and besides, we've nothing to eat off of or water to drink until I get Jupiter Pluvius cleaned out. Just make some sandwiches and we'll eat here."

Steve moved to the passageway. "Damn the stupidity of an outfit that doesn't figure out schedules so that employees have time to eat. Or gives them a station so broken down with outdated equipment that nothing is in working order."

"Think of the money, son," Brian said, not looking up from his flying hands.

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"I am," Steve muttered, "I am. What kind of sandwich do you want? Wait. Don't tell me. Let me guess. Peanut butter and jelly." He shook his head and shuffled into the passageway.

When he returned with a huge slab of bread smeared with the gooey mixture and a plastic container of juice for his partner, he took his turn at the table while Brian ate. The bearded youth perched on the edge of the sorting table and munched contentedly. He rolled one of the small mixed mail cans over and read the destination.

"Hey," he suddenly exclaimed, "there's something in this one addressed to us."

He laid the half-eaten sandwich on the stacks of unsorted cans and pried open the small carrier. Four-inch reels spilled out onto the table and Brian pawed through them until he found the one labeled "GPS Orion One. Attn: Aldridge-Prescott." He held it up with a sticky hand and surveyed it. "Now what do they want with us?"

"Read it," Steve commanded.

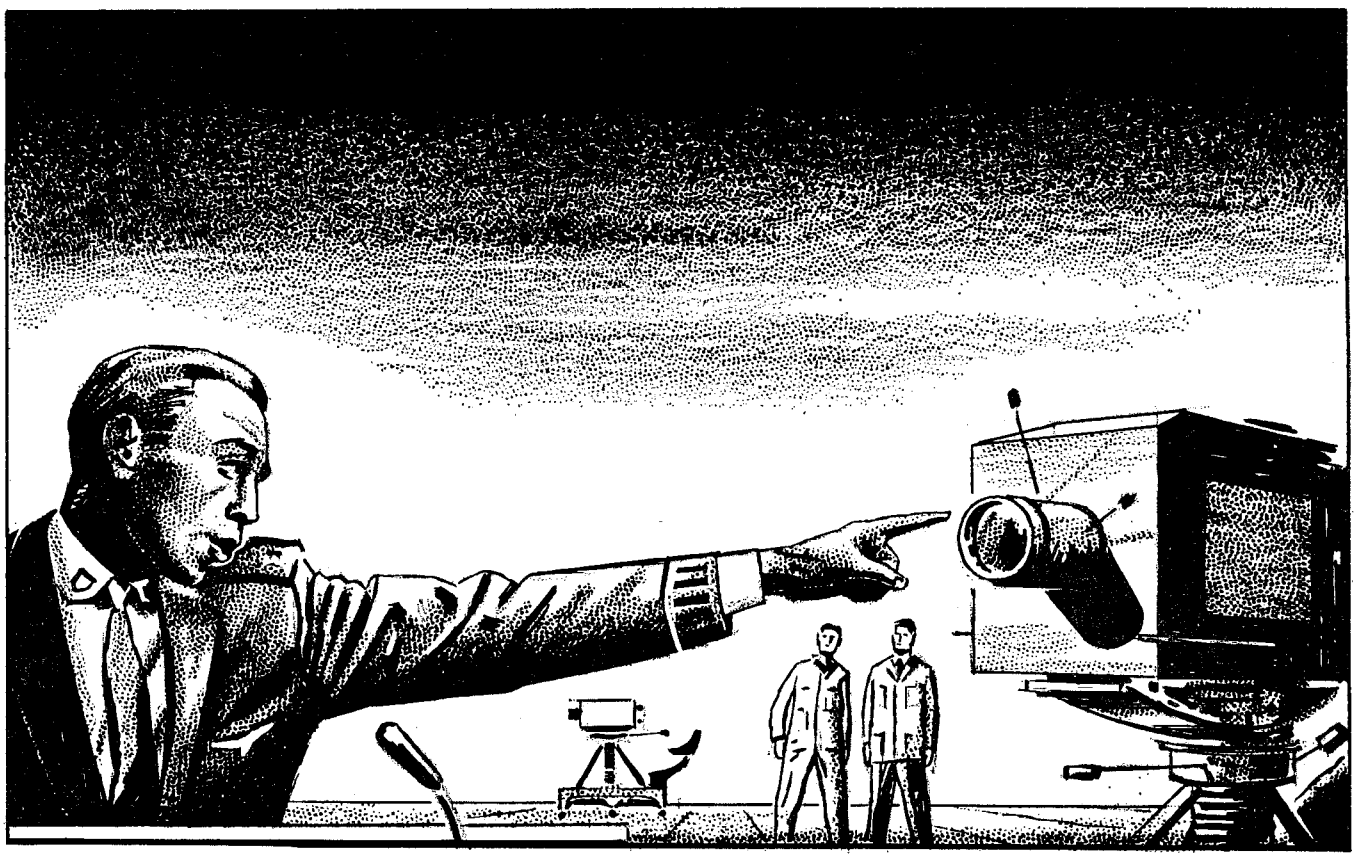
Brian hopped off the table and slipped the reel into a viewer. Both men stopped work to read the letter from district headquarters.

"TO: Station Tenders Brian Aldridge—Stephen Prescott
GPS Sub-Station Orion One
Co-ordinates Z737503R1374
FROM: Director
Orion District
SUBJECT: Discrepancies

1. It has been brought to the attention of this office that two discrepancies have been noted in the operation of GPS Sub-Station Orion One.

a. On five separate occasions in recent weeks, terminal mail handlers sorting shuttle carriers from GPS Sub-Station Orion One have reported difficulty in physically and manually handling canisters and opening canisters which have been re-routed through GPS Sub-Station Orion One. The reports indicate a strange and crystalline substance adhering to the canisters and in some cases, to the inter-reel containers. This substance has a tendency to become viscous under heat. You will make every effort to determine the source of this substance and to make certain that any leakages or other malfunctions which might be causing the substance to fall upon the canisters and carriers is corrected.

b. A review of supply requisitions from GPS Sub-Station Orion One reveals demand for several non-standard items. Among these are requests for yeast, dried raisins and malt. You are directed to refrain from requisitioning any items not specifically listed on the GPS commissary list. This practice will cease immediately and Supply Section has been directed to delete and report any further demands for such non-standard items. Further, requisitions for sugar from GPS Sub-Station Orion One are exceeding authorized quotas. You will keep all requi-



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sitions within authorized allowances and future standard sugar requisitions will be cut by an amount to be determined by Supply to rectify overages on previous shipments.

c. Your requests for replacement parts for air-conditioning unit Type C-2; disposachute Type S-214; and repair kits for cleaner unit Type B-3863 have been received. Table of Supply for your station indicates the normal replacement period is 96 standard days from this date. The above items will be supplied at that time. Requests out of schedule are not authorized.

2. Acknowledgment of the above discrepancy report and a statement of corrective action will be filed with this office by the senior handler aboard GPS Sub-Station Orion One within five standard days of receipt of this report.

W. Fleenhower
Director."

"You and your peanut butter and jelly," Steve exclaimed, pointing to paragraph 1 a.

"You and your beer," Brian snapped back, smearing the viewer with a sticky finger on the second paragraph.

The pair stared glumly at the viewer-magnified letter. Finally, Steve snapped upright, snapping his fingers.

"I don't know what we're in such a flap about," he said. "We just don't overdraw on the rations. That homebrew idea didn't work anyway. And we can always tell them that there is some kind of a leak in the refrigeration system and that we've got it fixed now."

"Suppose we can get away with it," Brian sighed. "But, now we're going to be short on sugar rations for the rest of the tour. We got any extra left over from your distillery days?"

"Nope," Steve said shortly, "I put it all to work."

Brian sighed again and snapped off the viewer. "On top of all that, we didn't get any parts for this junk pile and we'll have to make the best of this health hazard until the day we get off it." He eyed the chrono and turned back to the sorting racks. "We had better hop to it," he said, "or we're going to be in a bind when Taurus gets in. Then let's see if we can jury rig the air system, since we ain't eligible for parts."

He kicked an empty juice container and the crusts of several old sandwiches out of his path and edged up to the racks.

A few minutes later the last shuttle was on its way and the racks were clear. They left the sorting chamber and headed back to the main cabin. "Man, I'm whipped," Steve said. "I think I'll stretch out for a while until Taurus heaves to."

"Sorry," Brian said, "no can do. You get on the scan and watch for it while I see if I can get Jupe's pipes unplugged."

"Oh come on, Cap'n Bligh. I can't keep my eyes open."

"You'd better, muscle brain," Brian replied, "or you're liable to have a sub-space carrier right between your baby-blue sleeping eyes. Now get up there and quit moaning. We've got to have some water on this can and quick. I don't intend to start drinking the 'ponic tanks dry and besides, if they start to evaporate we'll be in a hell of a mess for breathing, let alone drinking."

"The way this honey-bucket smells," Steve said wryly, "I'm not convinced breathing is such a hot idea. While you're at it, see if you can get that disposachute and cleaner system working, too. Another week and we'll have to shovel everything into the control cabin and move into the sweatshop."

"I'll try," Brian replied, turning into the hydroponics chamber. Steve continued up the passageway to the control cabin.

Half an hour later, Brian had water flowing from the recycler and was beginning to tinker with the disposal system when Steve hollered from the cabin. "One big bull, loaded with bull, now at range one hundred King and closing."

The grappling operation snared the carrier and the handlers went to work. As they were breaking down the Taurus carrier load, three inbound shuttles homed in on automatics and disgorged their mail cans. The Taurus carrier was the last of the interstellar robots for the next ten standard hours. After they had worked the stellar canisters, the outbound system mail brought in by the three shuttles and two earlier shuttles, was re-canned and loaded aboard the empty stellar carriers drifting in orbital moorings beside the sub-station. The proper destination tapes, pre-computed by Central Station and distributed to all sub-stations, were locked into the robots' guidance controls and a half hour later, the big carriers flashed out of scanner view into sub-space.

"Now," Brian said, "you can sleep."

Without a word, the weary pair climbed into their bunks in the tiny crew quarters. "Thank God, you've got the water running again," Steve mumbled. "Now we can mix up some detergent and clean this stinking bedding. I'm glad I'm so sleepy I don't have to smell myself much lon . . ." He was asleep.

An hour before their chronolarm was due to scream, a muffled explosion rocked the little cabin. Both men jerked up out of exhausted slumber at the sound and vibration.

"What's happened now?" Brian cried, scrambling for his slippers. Steve had already pulled on his shorts and was out the door. The two men raced down the passageway towards the source of the noise. It had appeared to emanate from the vicinity of the pile room. They skidded to a halt before the shielded door of the pile chamber entrance tube. They checked the radiation counter beside the bulkhead. It was chuckling at its normal levels, well inside the green.

"Whatever it was, it wasn't the pile," Brian said with a sigh of relief and unsealed the door to the pile room. They ducked through the door and up the passage tube to the energy units floating out from the station in their

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own pods. A quick check of the units disclosed nothing. Back down the passageway, Steve resealed the door.

"I could have sworn that it came from back here," Brian said. He peered down the corridor and strained to hear any further-out-of-pattern noises or sounds. Then he sniffed. His head turned as his nose twitched.

"What's that smell?" he asked.

Steve tested the air and then let out an explosive cry. "Oh no!" he dived for the door of a storage compartment at one side of the pile room door. "My liquor!"

The blond giant flung open the door and the alcoholic reek of fermented fruit assailed their nostrils.

"What's THAT?" Brian shouted. A pool of liquid, strewn with dark bits of fruit, drained out on the deck, trickling between shards of shattered plastic. More of the mixture dripped from the walls and over cases of supplies stacked in the compartment. Wedged into the foam-sponge ceiling was a large stopper, together with more shreds of plastic and bits of fruit and liquid.

"Ooooh!" Steve moaned. "What a waste."

Brian grabbed the big man by the arm and spun him around. "More distillery?"

Sad-eyed, Steve nodded silently.

"Is this where the extra sugar went?"

"Yup," Steve nodded, "and the raisins. It worked too fast. Blew up."

"Got any more stashed away?"

Steve nodded again.

"Let's go," Brian said, "show me."

Two more of the big raisin-water-and-sugar-filled jugs were carefully stowed away behind the commissary stores in the little galley. Ominous hissing sounds came from both jugs and the two men dived for the stoppers. A bubbling gush of fermenting liquor spilled out over the deck and then subsided.

Brian rocked back on his heels and waved the brew stopper under his partner's nose. "You idiot," he exclaimed. "I knew you were on the verge of cracking up but I never dreamed you had gone over the edge."

"Aw, Brian, you've got it all wrong," Steve remonstrated. "It was all a very noble space research project. Is there a future for the production of alcoholic beverages under space-tight, bacteria-free conditions. Why, I could have been famous for this."

Brian surveyed the grimy figure of his partner and looked around the cluttered and unwashed counters of the galley. "Bacteria-free," he snorted. "Why we've cultured enough dirt and bacteria in this space-isolated test tube to infect a planet. Don't give me that 'space research' gas. You're just a stupid drunk and you're gonna clean up every bit of this mess before the first carrier homes in."

Equipped with a pan of water from the now-flowing recycler and an old undershirt, Steve began disconsolately mopping up the shattered remains of his experiment. Brian stood guard in the door of the storage compartment. "And when you get through with that," Brian said, "you can get the rest of that mush out from behind the galley racks."

A second later, the autoscan alarm began blaring in the control room. Brian spun and raced down the passageway with Steve close behind. They skidded into the control room and slammed into the console. Steve reached up and clamped off the alarm as they both peered into the screens. A blip hung motionless just inside the five thousand mile range markers.

"What the devil is it?" Steve puzzled.

"It's a ship," Brian replied, "and it can't be the Aldebran carrier 'cause it's almost an hour or more too early. Besides, this one isn't moving."

"It's not on the right track either," Steve noted. "Hey, wait a minute." He reached up and flipped on the communicator. ". . . Day!" Three centuries from the hydrosphere of Earth to the far-flung rim of the galaxy hadn't changed the universal distress signal. "Mayday . . . Mayday . . . Mayday," the speaker blared.

Steve spun the short-range transcommunicator dial until it locked on the pulse coming from the unknown ship. A new audio signal filled the control room. "This is Olympus ship *Monitor* calling for assistance. I have lost my drive."

"A woman's voice," Brian whispered.

"A woman," Steve breathed.

"This is Olympus ship *Monitor* calling for assistance," the feminine voice repeated. "I have lost my drive."

"Whadda we gonna do?" Steve asked.

"Answer her, you plate skull," Brian retorted.

Steve flipped the visiplate circuit. "*Monitor,* this is Postal Sub-Station Orion One," he called. "We have you on our screens."

The visiplate blurred and then snapped into focus. A very feminine round face, topped with a burnished cap of copper-colored hair and featuring a pert button nose and deliciously curved lips was framed in the screen. Both men gulped.

"Oh, thank goodness," the delightful apparition cried. "Can you reach me or get me off this thing?"

Both men were so entranced by the first sight in seven months of a mobile female face that they just stared.

She stared back.

"When you're through feeding," she snapped, "you might answer me."

Brian and Steve jerked back in shock. "Wait a minute," Steve called confusedly and opaqued the cabin visiplate. He cut the circuit and turned to Brian. "Quick," he hissed, "what do we do?"

Shaking his head dazedly, Brian fumbled for words. "Why, we . . . we . . . why, hell, we rescue her," he blurted.

"How?" Steve inquired. "Break out the lifeboat?"

"No, of course not," Brian said. "We'll haul her in on a tractor."

"Here?" Steve gasped, looking around the cabin.

"Where else, knot head?" Brian snapped.

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Steve surveyed the cabin and ran through a quick mental scan of the rest of the station. "This is being saved?" he queried.

He flipped on the visiplate and the lovely redhead swam back into view.

"M . . m . . miss," he stuttered, "you better get into your crash pad. We're going to bring you in on a tractor beam and it might be a little rough. We usually haul in a much larger robotic mass that doesn't object to being banged around. We'll be as careful as we can but you had better lock yourself down. Leave your communicator on though, so we can hear you in case it gets too rough."

The girl smiled. "I've got a talkie over the crash pad," she said. "I'll keep you posted. Thanks."

The screen opaqued and a few moments later refocused. The copper colored hair was now encased in a helmet and the girl's face peered at them through the front plate. She had donned space gear before strapping down. "All set," she cried.

Seated at the tractor controls, Brian locked onto the communicator beam and applied power to a single retractor. In the visiplate the girl's image jumped and shivered as the beam slammed onto her ship and seized it in its field grip.

Ten minutes later, the little ship was locked against the station personnel hatches. The outer ports of both the station and the ship opened and standard air lock matching seals blew into place. As the amber light on the station board came on to indicate air-tight seal, Steve opened the air pumps to the locks. A moment later the light shifted to green and the pressure-activated inner lock door on the ship and the station irised open.

Just inside the door, the redhead, still in space gear, stood waiting for her rescuers

She walked into the lock, fumbling with her helmet catches. Both men grinned foolishly at her and made no move to go forward. The girl walked into the station and still smiling, shoved her helmet back and took a deep breath. She seemed to strangle, then began coughing as her face twisted into a grimace. Steve leaped forward and grabbed her arm.

"You all right, miss?" he asked anxiously.

She continued to gasp for another moment then turned to him, aghast. Her nose was wrinkled in disgust.

"Gods of Uranus," she gasped, "what have you got on this station? A zoo?"

Both men looked at her puzzedly.

"That smell," she cried, "it's terrible. It smells like a fermenting cat."

Brian moved forward and the girl backed up in fright at the sight of his tangled mat of hair and beard. She stared first at the bearded and half-naked Brian and back to the blond lion's mane of Steve.

"I've died," she murmured, "and have gone to hell."

The partners looked uncomfortably at each other.

"I guess we do look a little on the raw side, miss," Brian spoke up apologetically, "but we really weren't prepared for guests. And certainly not a charming and lovely young lady."

A flush tinged the girl's cheeks.

"Let's get you into the station and out of that suit," Brian continued. He took her arm and led her through the inner door. The girl paused inside the port and let her eyes sweep around the cluttered and untidy room.

Now it was the men's turn to flush.

"Like I said," Brian repeated, "we weren't exactly cleaned up for company. We've had a couple of small problems with the housekeeping equipment breaking down."

The girl looked around the room once again and then turned to scrutinize the men more closely. Her nose sniffed cautiously at the air.

"When did it break down?" she finally asked. "During the last millennium?"

Steve's face darkened. "We said we had some problems, lady," he growled. "We didn't send you an engraved invitation to come aboard. It sounded to me as though you invited yourself and would be glad to be hauled in. If this is too much for you, we'll be happy to put you back aboard that fancy sports job of yours and let you try for a better mooring and accommodations."

"Now, hold on . . ." Brian said. "She's had a . . ."

"No." The girl stopped him. "He's right. I am sorry and I should keep my mouth shut. I'm grateful that you answered my call and I have no right to be so critical. It's just that . . . that this," she swept her hand around the room, including both young men in the gesture, "took me a little off-guard. I apologize. Will you help me out of this suit?"

She smiled sweetly at Steve and the tall youth blushed. Brian's brow lowered and he moved in to assist. Steve brushed him back.

"I can handle this, friend," he said shortly, as his big fingers fumbled with the side catches on the girl's flexible suit.

Brian shrugged.

"Introductions all around," he said. "I'm Brian Aldridge, senior handler on the station." The "senior" was emphasized. "He's Steve Prescott, my assistant." Steve snapped a dirty glance at his partner. "Welcome aboard the only self-perpetuating garbage dump in space."

The red head grinned. "I'm Sharon Reilly," she said, "and I was heading for Demetrius II when my drive blew. I'm thankful I drifted close enough for you to pick up my call."

Steve fumbled open the last catch and started to say something when Sharon stepped out of the suit. Whatever he was going to say was lost forever. The girl was wearing only a brief halter and shorts. Her long, lightly tanned legs and bare abdomen glistened lightly with perspiration from the heated suit.

Brian gulped and blinked. Steve just stared with the

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expression of a stunned ox. The girl took no notice of the impact she had made. She bent over and began rolling the light suit into a ball.

"Guuuugh," said Brian.

"Aaaawk," Steve choked.

The girl straightened up with the rolled-up suit in her arms. She glanced puzzedly from one to the other. "Something the matter, boys?" she asked wide-eyed.

Glassy-eyed, Brian shook his head slightly.

"I'll go and stow this away in my ship," she said, "and then I'll be right back." She turned and bounced through the locks to disappear into the spacecraft.

Steve rolled his eyes in his partner's direction. "Whadda we gonna do?" he wailed.

Brian snapped out of his daze.

"The first thing we've got to do," he barked, "is to get this filthy place cleaned up."

He paused. "On second thought," he mused, "maybe the first thing we ought to do is get ourselves cleaned up. Nope, get the joint first, then ourselves."

He turned to Steve. "Get going with a mop," he said. "I'll wait here for Sharon."

Steve turned to go for the cleaning equipment. Suddenly he spun on his heel. "Me clean up," he roared. "You'll wait for Sharon? The hell you say, buddy boy. You clean up and I'll wait for her." He advanced menacingly on his smaller partner.

Brian drew himself up to his full five-feet ten height and glared up at the six-foot plus Steve. "I'm the senior handler," he snapped, "and I said 'you clean up.' "

Steve reached out and carefully clamped a huge hand in Brian's beard, then slowly began to lift.

"On second thought," Brian choked out, "maybe we both will wait for her and then we'll both clean up." Steve's grip relaxed.

They were flanking the door to the lock when Sharon reappeared. "All secure," she said brightly as she entered the station. She moved slowly around the sorting chamber with a young man at each elbow.

"My," she exclaimed, "whatever in the galaxy is all this strange equipment?"

Brian moved quickly to the sorting racks and began explaining how they worked. He hastily kicked a pile of refuse under the counter as the girl leaned over to examine the gear. Suddenly he broke off his explanation.

"I say," he exclaimed, "you must be worn out and hungry from worry. And here we are telling you about this junk. Time for that later. Right now, let's get some food in you and find you a place to rest."

He took Sharon by the arm and led her towards the door. When the men had finished working the last of the mail the night before, Brian had left a shuttle tube seal open above the rack nearest the passageway door. It was an oversight frowned upon by the Service since an incoming autoshuttle could jam the outer port when it slammed into position to disgorge its canisters. It was a good way to wake up trying to breath space.

As they passed the locked open seal, Sharon was chatting with Brian. With a practiced gesture, her hand shot out and tripped the safety catch. The seal hissed closed and she continued chatting out the door. Steve followed the pair. The big man tossed a puzzled glance at the girl and at the closed tube, frowned, shook his head and followed them out the door. They float-shuffled up the passageway to the main cabin. Sharon turned into the compartment and then stopped short, a deep blush coloring her from halter top to her copper hair. She stared across the room at the control console and then dropped her eyes.

"Ooops," Brian gulped. Another of his life-sized tri-di dolls had been pressed into service as a picture frame for the chronometer on the vertical panel beside the console. Again, the adjustment knobs had become functional appurtenances, while the chrono clicked off the hours, minutes and seconds from the pin-up's midriff.

"Navel observatory time," Brian said weakly.

He looked around frantically for something to cover up the nude cutout, then reached into the sleeping cubby off the cabin and grabbed a sheet from an unmade bunk. He started across the cabin.

"Don't bother," Sharon said frostily. "You'd never know what time it is." She turned away but not before she cast a chillingly critical and feminine eye over the lush contours of the cutout.

"Although that would never give you the right time of day, anyway," she added. "She obviously runs fast all the time."

It was Brian's moment to blush.

Steve had brushed a pile of papers and stale crusts of an old sandwich from a chair and was frantically trying to hide the assorted refuse piled on the counter that served as a station office and makeshift eating counter.

Brian deftly slipped the chair behind the girl's knees. "Sit down Miss Reilly," he said, "you must be exhausted. It is MISS Reilly, isn't it?"

The redhead nodded.

"Good," Brian replied, rubbing his hands. "My name is Brian. Brian Aldridge. May I call you 'Sharon'?"

"You told me your name," Sharon said, "and yes, you may."

"Can I call you 'Sharon' too?" Steve asked over his shoulder.

"Of course," the girl replied. "I'm starved. And I think reaction is setting in. I didn't realize how scared I was out there all by myself. I don't know whether to get the shakes or just cry."

Both men swung around and hovered over her solicitously. Steve touched her bare shoulder and then snatched his hand away as if burned. "Don't cry, Sharon," he said, "it's all over now. You're safe."

The girl stared wide-eyed around the cluttered and messy cabin and then at the two half-naked mailmen.

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"I g . . g . . guess I am," she said tremulously. "What an experience." She began to quiver.

"I've got just the thing for those shakes," Steve cried brightly. "There's still some good brew left in my jugs. You wait . . . ouch! What was that for?" he demanded angrily of his partner.

"What he means, Sharon," Brian said, glaring at the big blond youth, "is that we'll brew you up some coffee in just a second."

Sharon sniffed cautiously at the air.

"Just what is that I smell?" she asked. "I mean the overriding odor, not the general miasma."

"As we told you," Brian replied smoothly, "we've had some trouble with the air-conditioning equipment, to say nothing of the disposachutes, the cleaner units and the water recycler."

"What did you use to clean out the air conditioner," she asked, "beer?"

"No," Steve replied, "that was in the water recyc . . . damn it, Brian, you kick me again and I'll paste you against the bulkhead."

"Beer in the water recycler," the girl exclaimed.

"It didn't work," Steve rumbled on. "We had to clean out the whole system. That's why I put some mix to working in jugs. You want to sample it? It should be great by now."

Sharon stared at the two youths.

"Bring me some," she said weakly, "now I really need it."

Brian threw up his hands in despair. "Make it two, muscle head," he said, "I have a feeling I'm gonna need a shot myself."

"I'll make it three," Steve chortled happily as he headed for the remnants of his jugs still in the galley.

Brian dragged another chair over and sat down facing the girl.

"I know this looks pretty rank at first glance, Sharon," he began, "but basically, there's really nothing amiss. We have had some problems with this antiquated equipment the Postal Service must buy from a junk dealer. On top of that, we're on such a tight round-the-clock mail handling schedule that the instant something breaks down, everything on the station goes to hell. I admit that Canary Brain did try some offbeat alcoholic experiments, but it was just to break the monotony."

"Five years," Sharon muttered to herself, "five years, and I've never run across one like this before."

"What?" Brian inquired.

"Nothing," she replied, shaking her head as if to wake herself up, "just talking to myself. You were saying . . .?"

"Well, we've been trying to get things running but at the same time, we've been knocking ourselves out to keep the mail going through the station. That's the most important job and we just sort of let the other things slide. We hadn't expected any visitors for almost a month and then that would only have been the resupply shuttle. So you see, you did catch us at an awkward moment."

Sharon nodded. "That's obvious."

Steve came lumbering back into the cabin, juggling three reasonably clean cups, half-filled with a murky, brownish liquid. He handed each of them a cup.

"A toast," he cried, "to the fair damsel in distress and to the two gallant knights who rescued her from the dragons of space."

Brian grinned and rose from his chair with his cup raised high.

Sharon smiled at the two men and then started to rise from her chair. A horrified look spread over her face as she froze, muscle-taut in the act of getting up. There was a second of silence, then she reached cautiously behind her and felt gingerly at the seat of the chair.

"I'm stuck," she wailed.

"You can't be," Brian cried.

She rose again and this time there was the sound of adhesive being pulled away from a resisting surface. Sharon felt at the seat of her shorts and then pulled her hand away with a grimace. "Ugh," she exclaimed, "what in space was on that chair?"

Brian shot a quick glance first at the chair. "Jelly," he replied.

"A toast," Steve cried out to divert the angered girl. "A toast to our lovely guest. A-a-a-a-chooooo!"

An explosive sneeze ripped from the big youth and his cup of brew tilted wildly and then torrented over the shrieking girl.

"*Geshundeit*," Brian said automatically.

Five minutes later, Sharon had locked herself in the sleeping compartment after handing out her shorts and halter through the door. "Wash them," she ordered.

Each carrying one piece of the skimpy clothing, the two men went to the hydro room to rinse out the brew-stained garments. Brian stepped up to the sink, swept back the cluttered utensils and cracked a valve. Nothing happened.

"Jupe's clogged up again," he groaned.

"What'll we do?" Steve inquired.

Brian thought for a moment. "You go aboard her ship and see if you can find her some fresh clothes while I see if I can get Jupe unplugged again. We've gotta have water to clean up and to get something decent to drink."

"Right," Steve replied and hurried towards the air locks.

Brian dug out a packet of tools from beneath the tiny sink and went to work on the water recycler. He was jammed sideways under an open pipe coil, reseating a tube end when he became aware of Steve's presence back in the room. Brian squirmed out and turned to his partner. The big blond stood silently in the center of the room, his face flushed with anger.

Brian wiped his hands on his shorts and looked puzzledly at his partner. "What's eating you?"

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Steve thrust out a clenched fist and then slowly opened his hand. Resting in the palm was a shiny metal badge. Brian bent closer to read the inscription. Circling the bottom of the shield were the words: "Galactic Postal Service."

Across the top of the badge was a single word. "Inspector."

The bearded youth stared unbelievingly at the badge.

"A dirty spy," Steve muttered darkly.

"Not dirty," Brian replied absently, still transfixed by the badge.

"A Postal inspector," Steve rumbled.

"A female Postal inspector," Brian added.

Steve's face brightened. "Yeah," he breathed.

Brian snapped out of his daze. "Where did you find it?"

"Tucked underneath some wachamacallits in her locker," Steve replied. "There also was a set of orders. I left them there. We're the inspectees all right. There's one bit of justice though. I took a quick rundown of her control board and punched up power. She really is broke down. No pile, no power and just the short-range condenser transceiver working. She must have just made it when a fit hit the pile."

"I just can't believe it," Brian said.

"You better believe it," Steve retorted. "We're in trouble. What do we do?"

Brian convulsed and a loud sneeze was Steve's answer. " 'Scuse me," Brian gasped, "must be something in the air. Now, let me think a moment."

The two men idly studied the badge while trying to assemble their thoughts.

"Why don't we just stuff her back in the air lock?" Steve suggested.

"What, and let her go running back to Region with the kind of report she'd turn in on us?"

"Naw," Steve replied. "I mean, stuff her back in the air lock and jettison her. Nobody would know the difference."

"Nope," Brian shook his head. "It would never work. She'd just go into orbit around the station and somebody would be sure to spot her eventually."

"Hey," Steve cried, "we could stuff her in an outbound carrier. Sort of 'special delivery.' " He guffawed.

Brian eyed his partner disgustedly. "Shut up and let me think."

"Did you find any clothes for her?" he asked in a moment.

"Sure, but I forgot to grab them when I ran across that Judas shield."

"Good," Brian snapped, "come on."

He took the badge from Steve and the two of them went back to the main cabin and to the closed door of the crew quarters. Brian rapped on the door.

"Open up," he called.

"Hand me the clothes," Sharon replied, a long, tanned arm reaching out around the partially opened door.

Brian carefully placed the metal shield in the palm of her outstretched hand and closed her fingers over it. The arm remained motionless for a moment while the sensations of the fingertips registered on the brain. Then the hand and arm vanished behind the door and there was a moment of silence, broken only by the distant and muted vibrations of the engines.

"Where did you find this?" Sharon cried angrily.

"Just where you left it," Brian replied.

"Snoopers," she shrieked.

"Us," Brian asked, "or you?"

"All right," she cried, "so it's out in the open. Now hand me my clothes this instant."

"Not so fast, inspector," Brian retorted. "I think we have a little talking to do."

"There'll be no talking until I'm decently dressed," Sharon snapped. "Hand me my clothes and I mean right now."

"To the contrary, my dear madam inspector, there'll be no clothes until we do some talking."

"I want my clothes," Sharon cried out with a half-sob, "and I'm not a madam."

"A spy, that's what you are," Steve growled.

"Just what were you sent out here for?" Brian inquired.

"I'm just following up a discrepancy report," Sharon said, "and from what I've seen already, 'discrepancy' isn't the word for it. 'Disaster' would be better."

"Hm-m-m," Brian mused, "prone to snap judgments."

"Listen, you bearded ape," Sharon howled, "you hand me my clothes this instant or you'll wish you never heard of Galactic Postal Service."

"I already wish that," Steve said.

Across the cabin, the autoscal alarm blared the proximity of an approaching carrier.

"Oh, oh," Brian cried, "here comes Betelgeuse One. We'll continue this conversation after we unload this carrier. Come on, Steve."

The two men wheeled across to the console to track and tractor the first of the day's mail carriers to the station.

"You give me back my clothes," Sharon screamed through the crack in the door.

"Later," Brian called over his shoulder as he manipulated the tractor beams hauling on the captured carrier. When the carrier was locked to the station, they headed for the sorting chamber.

"I'll have you two condemned as a health hazard to humanity," Sharon screamed at their departing backs.

"She sure is the edgy type, isn't she?" Steve observed, then blasted out with another watery sneeze. "Dammit. You don't catch cold in space."

"An obvious statement," Brian replied. He sniffled and swallowed hard as he hurried to the controls.

The long canisters began spewing out of the heater chamber, still moist with melted and condensed water from the air lock. The two men worked in silence, speedily

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shoving full canisters into shuttle hoppers and exchange hoppers. Several were "local system" loads and these were shunted aside until the gross load was re-distributed. As each canister rolled out of the airless carrier into the station lock, magnoprinters stamped the Standard Galactic time and date of arrival on the tube. A similar outgoing cancellation was imprinted as the canisters were stuffed into outbound hoppers. Brian and Steve worked swiftly and without conversation. But the silence was broken sporadically by a wheezing sneeze from Brian, usually followed a moment later by an explosive one from Steve.

So intent were the pair on the task at hand that neither noticed the arrival of the girl in the room until she banged against an empty canister. Both men turned quickly.

Sharon had rummaged into their personal gear and come up with a pair of Brian's shorts and a pullover shirt of Steve's. The latter was gathered in a huge knot at her midriff while the shorts were held up by a tightly cinched belt. The effect was totally feminine.

Brian let out a low whistle. Steve just gulped and sneezed.

Sharon tossed her golden red head and sniffed disdainfully. She strode quickly past them and into the open lock to her ship.

"Just go right on with your work," she said. "I'll get my own clothes. Then we're going to have that talk." She vanished into her ship.

"Hey," Steve cried, "she's cute even in men's clothes."

"Shut up," Brian said, "and keep working."

They were finishing up the last of the local system retubing when Sharon reappeared, this time dressed in loose coveralls that tried without success to conceal her femininity. She hopped up on the edge of a vacant sorting table and watched the two men work. Despite the general slovenliness of the station, there was nothing sloppy in the way the two dispatched the mail. They were still tossing the last canisters into hoppers when two local shuttles homed automatically into the station with dull clangs and seconds later, fresh canisters spewed out onto the sorting racks. Without a change of pace, the pair shifted to the new work load. The girl inspector silently surveyed their actions. A few minutes later, a third shuttle slammed into the station and more mail piled up. Now a fine sweat beaded the torsos of both men. The sneezing became more frequent.

"Damn," Brian muttered as a small local "pouch" squirted out of his hand at his latest spasm. He got down on hands and knees and groped under the table for the can.

They had worked through two-thirds of the shuttle loads when the autoscan alarm blared the arrival of another carrier and both men dropped what they were doing to go to control and lock down the new arrival.

Sharon had produced a notebook from a coverall pocket and had been making brief notes for the past hour, glancing occasionally at the chrono on the bulkhead.

Now she jumped off the table and followed the handlers to the control room.

"Do they always come in as close together as they are today?" she asked.

"Sometimes closer," Steve growled as he punched the command signal for the incoming carrier to begin braking.

Sharon made a fresh entry in her notebook. "Are you two going to get any kind of a break during the next four hours?"

Brian sat poised over the tractor controls, waiting for Steve to give him the go ahead. "With luck, and if we hustle," he replied, "we may get a half hour or more in about three hours. There's usually a gap between the Wolf and Korman carriers. If you're hungry, there's food in the galley but you'll have to wash up something to eat from. I've got the recycler going again. Too busy to play host to our superiors right now."

"Take 're," Steve called out.

Brian triggered the tractor beams at the approaching and slowing carrier.

Sharon pocketed her notebook and left the cabin. For the next two hours she wandered throughout the station, peering into storage chambers, strolling through the shielded passageway to the pile chamber drifting out from the station on a quarter-mile-long umbilical cord of power cables and catwalk. She wrinkled her nose in dismay at the half-cleansed mess left by the exploding brew jug moments before her arrival. And she looked into the hydroponics room with its relatively sweet-smelling greenery.

She made notes as she surveyed the untidy condition of the station. She also made notes after reading manufacturers' specification tabs on items such as the air-conditioning control panel, the waste disposal units and the cleaner system. In the unkempt galley, she fished around until she found a fresh package of crackers and a sealed juice container. She nibbled on the wafers and washed them down with sips from the container as she continued her tour of the station.

It was just past the two-hour mark when she came back to the sorting room. It was empty and all the inbound and outgoing mail had been tubed out. In the control room, she found Brian slumped in a chair, his head pillowed in his arms. A glistening sweat coated his naked torso. Through the open door to the crew quarters she saw the big blond youth stretched out on a bunk. His bulk heaved and shivered as a sneeze racked his frame. Steve groaned.

She frowned at the pair.

"What's the matter with him?" she asked, pointing at Steve.

Brian raised a watery eye to her. "He doesn't feel too hot," he replied sniffingly. "For that matter, neither do I." He sneezed.

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"You two sound like you've caught colds," Sharon said frowningly.

"Don't be silly," Brian sniffed, "you can't catch cold in a sealed environment. Nothing contagious." He gasped out another sneeze and blew his nose. "Must be something in the air-conditioner. Just dust."

Steve's big body shuddered with another sneeze followed by a loud coughing spell. The big man groped a sheet up over his body. Sharon walked quickly across the cabin and into the cubby. She placed a cool hand on Steve's brow.

"He's burning up," she exclaimed. She peered anxiously at Steve's face. He managed a weak grin. "Hey, you're really sick," Sharon said. She turned and moved to Brian's side and repeated the touch on the forehead.

"You don't feel too cool either," she murmured. "You two have caught colds. I don't care what the manual says."

Brian sniffled noisily and blew his nose. "Damn beard," he muttered. "I told you, inspector, the only way you can catch cold is for someone to give it . . ."

He broke off and sat upright.

"You," he croaked, "you're the one."

He pointed a jabbing finger at her. "Did you take your full immunization series before you blasted off?"

Sharon went wide-eyed. "I had a series about four months ago," she stammered. "They didn't give me much time and I had a couple of things I had to do before I took off."

Brian groaned and let his head sink back to his arms.

"But my last series couldn't have worn off," the girl wailed. "It just couldn't."

"It didn't have to," Brian said wearily. "All you had to do was come in contact with someone who had a cold. You wouldn't be affected but you became a carrier."

"First she turns out to be a Judas goat," Steve moaned from the bunk, "and now she turns into Typhoid Mary."

By the time the approach alarm sounded again, Steve had been secured into his bunk and Sharon was sorting through the medical kit for antibiotics and other palliatives.

"Make him comfortable," Brian said, "I've got to bring this can home." He crossed to the control console.

"Can you manage by yourself?" Sharon asked.

"If I don't sneeze a scope out or cough when I'm bringing 'er down," he replied, "I can manage."

While Brian wrestled with the command signals, the girl found a basin and filled it with warm water. She returned to the big youth's side and began sponging down his feverish and grimy head and torso. Then she deftly jabbed a dermaspray tube of antibiotics against his upper arm and squeezed. She tossed the empty syringe aside and picked up one of sedative and sprayed through the skin of the other arm. By the time she had pulled the sheets up to his neck and collected the empty tubes, Steve was tossing in fretful and fevered sleep.

Sharon found another antibio spray and unsealed it. She walked to the console. Brian had locked onto the carrier and was maneuvering it to the side of the station. Sharon waited. When the station reverberated to the impact of the carrier and Brian straightened up from the board, she seized his wrist and sprayed the medication into his skin.

Brian jerked his arm back. "What's that for?"

"Something to combat the virus you say I unloaded on you."

Brian peered suspiciously at his arm and then looked across the cabin to the sleeping quarters. "How's Steve?"

"He's asleep," Sharon replied. "How do you feel?"

"Lousy," Brian said, "but I can keep going. Sorry to delay our little talk, inspector, but I've got a carrier to process. If you'll excuse me." He brushed past her and went to the sorting chamber.

The girl crossed to the cubby and eyed the sleeping blond for a moment, then followed after the bearded youth. He had the transfer chamber open and the icy tracks of tubes were squirting through the cancellation heaters onto the tables. Sharon moved to his side and lifted a tube to glance at the destination.

"What do you think you're doing?" Brian snapped.

"You just do your job, Mr. Aldridge," she replied, "and let me do mine. I was working terminal mail before you started in the Service." She flashed her eyes along the banks of labeled hoppers, then shoved the tube into the proper receptacle. Brian shrugged and continued working. Two shuttle loads of outbound mail already had piled up on the benches during their brief recess and for a half hour the youth and girl worked steadily to cut down the load. By the time they could see the bottom of the bench, Brian was breathing raggedly and his eyes were burning.

He grabbed a tube and cracked it open and began flipping the breakdown pouches into the proper outbound containers.

"How come you'd pull such a lousy, sneaky trick on us?" he inquired, without looking at the girl.

Sharon paused and glanced at his bent back.

"I'm sorry about that," she said, "but in light of what the director has told me and from the reports about the station, frankly, we didn't know what to expect. We just thought it would be better not to announce an inspection, but rather, to catch you in the act. Although just what acts, we weren't really sure. You should see some of the reports on the condition of the terminal canisters and the reports on your strange commissary requests. We thought we might have a couple of idiots on our hands or perhaps a couple of con men using the station as a cover for some other activity. It's happened, you know.

"The director was afraid that if you knew I was coming and who I was, you'd cover up all your surreptitious activities. I was just going to burst in on you unannounced. But then my power failure was unplanned and the whole thing almost was a real disaster for me."

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"Lousy trick," Brian muttered. "Why send a woman?"

Sharon bristled. "Because I am a woman," she snapped. "That doesn't make a bit of difference. I got my badge the same way a man would have earned it, by ability and training. Sex doesn't mean a thing."

Brian exploded with a sneeze. He sagged white-faced against the bench and Sharon jumped to his side.

"I am really sorry about the cold carrying," she said, holding onto his arm. "That was just plain criminally stupid on my part and I intend to report myself when I get back." She tugged at his arm. "Now you come on back to the cabin with me and I'm going to put you in the sack with your partner."

Brian straightened up and shook his arm free.

"Nothing doing," he sniffled, "this station has got to be kept in service and I'm the only one left to do it."

"Are you now?" Sharon said with soft menace. "And I suppose that a regular GPS inspector isn't qualified to do the simple-minded mechanical tasks of a mere mail handler?"

"You said it, I didn't," Brian replied weakly.

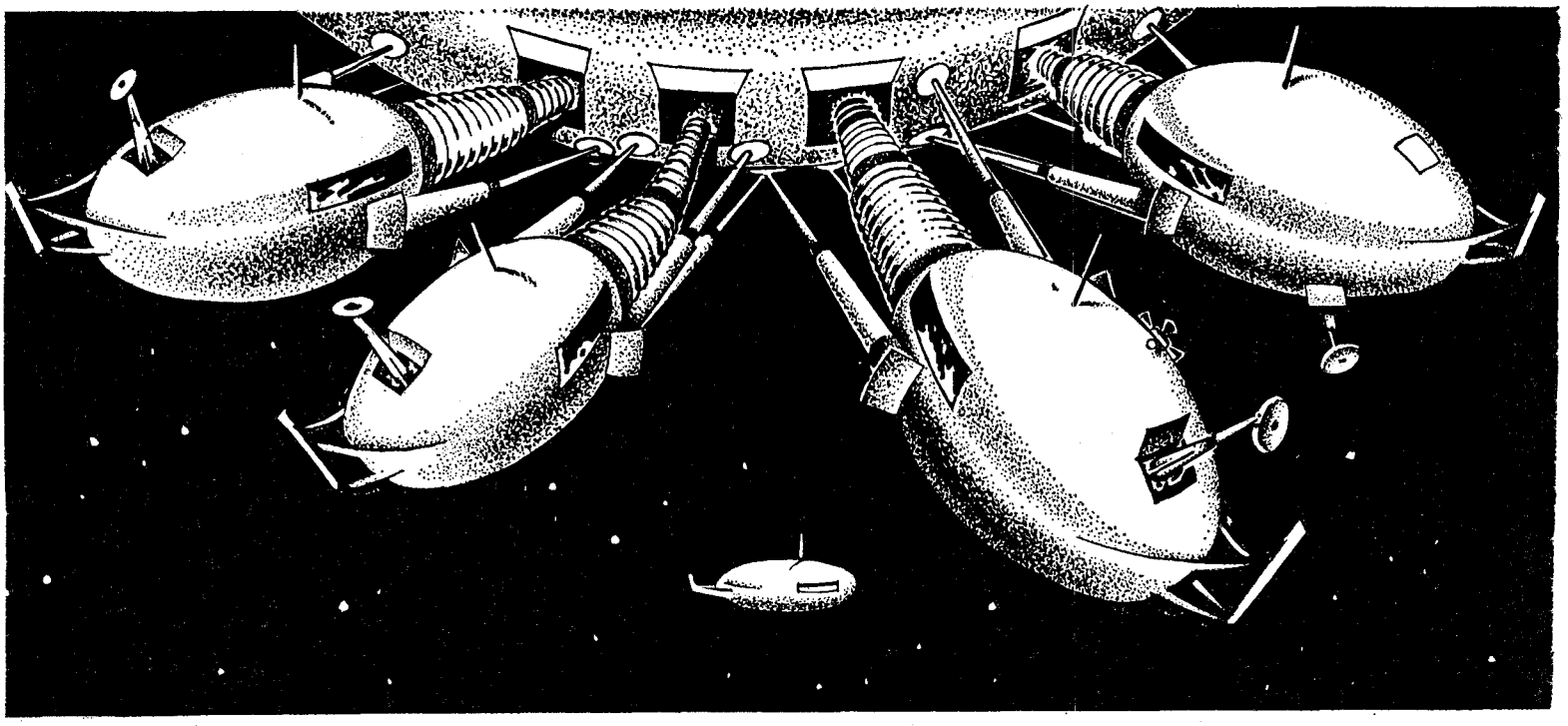
"And I'll be thanking you to keep a civil tongue in yer head," Sharon retorted angrily in long-sublimated ancestral brogue. "You'll go to your bunk, mister, and that's an order."

Brian sneezed and then lapsed into a wracking fit of coughing. As he regained his breath, two shuttles arrived almost simultaneously and dumped their tubes into the station. Brian eyed the new work load.

He turned and headed for the main cabin. "Aw, to hell with it," he muttered weakly.

"Stop off at the water taps," Sharon called after him, "and get the worst of that filth off you. I'll be in after I get some of this mail sorted."

By midwatch, both youths were under heavy sedation and still feverish but apparently resting more comfortably. In between the skimpy breaks in carrier and shuttle arrivals and departures, Sharon had re-dosed both of them with more antibiotics. In another brief break, she had dashed to her ship and skinned out of the warm coveralls in favor of the lighter and cooler shorts and halter. She struggled to keep up with the constantly growing pile of tubes and pouches in the sorting chamber but the inflow steadily mounted. She shoved and flipped and tossed and packed throughout the watch, breaking away only to answer the raucous blare of the approach alarm and to bring another carrier to the station. At the end of the midwatch, two unloaded carriers were moored beside the transfer hatch waiting to be processed and tubes were stacked in all the possible space in the chamber. Halfway through dinner watch, the last carrier of the day was hauled in and Sharon paused long enough in transit from control console back to sorting chamber to grab another juice flask and cracker package from the galley. Munching tiredly on the crackers, she went back to her sorting. She paused occasionally to bite into the cracker or take a sip from the open juice flask on the table beside her.



She was sorting out the local pouches for Dorian IV when she upset the half-full juice flask onto the table and the tubes.

"Damn," she cried and looked around for something to mop up the liquid. There was nothing in the sorting room and by the time she came back wearily from the galley, most of the liquid had seeped across the table and through the scattered tubes. She dabbed ineffectually at what moisture she could see and tossed the rag to a corner. She went back to sorting.

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It was after midnight, Standard Galactic Time, when she shoved the last tube into hopper. Sharon slumped against the table in exhaustion and peered with bleary eyes at the empty room. With an effort, she pulled herself erect and headed back to the main cabin. She looked in on the two sleeping patients and felt their foreheads. Their fever was slightly higher. Steve moaned softly in his sleep. She found her basin and sponged the warm brow.

Brian was somewhat cooler and a slight bead of sweat gave hint of a breaking fever. She smiled at the flushed and bearded face and ran her hand through his tangled dark hair. Sharon sighed and then quickly derma-sprayed fresh medication and sedatives into the sleeping pair.

Back in the main control room she moved a portable audioview screen to face the approach scanners. She plugged the screen into the intercom circuit and headed for her own ship. At the air lock, she again plugged the station intercom into her own ship communicator system.

Five minutes later she sank into exhausted sleep in her own bunk.

It seemed as though she had been asleep less than a minute before the strident blare of the approach signal dinned into her fatigue-numbed mind. She awoke and sat up groggily, trying to orient herself to the noise. Her eyes moved sleepily up to the viewscreen over her bunk and caught the flashing red light of the approach alarm above the autoscanner. She came wide awake and leaped from the bunk. Sharon jumped into the skimpy shorts and ran for the air lock fumbling with the clasp on her halter as she ran. As she turned into the station control cabin, Brian was standing befogged and feverish, clutching at the door frame of the crew room and trying to cope with the problem of the alarm and his subconscious sense of duty.

"Back in bed," Sharon snapped as she crossed to the console. Betelgeuse One was right on time and approaching on collision course. The day had begun. Too sick and sedated to argue, Brian had sagged back onto his bunk. By the time Sharon had the carrier alongside and locked, he had sunk back into fretful slumber. The girl paused long enough for medication and rummaged in the galley for a more substantial breakfast than crackers and juice. Still sipping on a final cup of coffee, she went determinedly into the sorting chamber.

The breakfast had cost her dearly. Three shuttles had sneaked in together with the Betelgeuse carrier and the tables were already jammed with waiting tubes.

"Oh dear," she cried and set the cup down on the handiest surface. She dug into the tangle of tubes.

The day became a nightmare. No matter how hard and fast Sharon flew around the chamber and dashed back to control, the mail kept getting ahead of her. By mid-watch, after hastily medicating the two men who alternated between moments of sleep and doped wakefulness, she was helplessly and hopelessly behind. Three carriers were in their moorings, still to be unloaded. Shuttles arrived, disgorged their loads, took on new ones from the hoppers and fled back to the planets. Suddenly the air conditioner quit, then explosively burped. The momentary pause vacuumed the dust precipitrons and the burp vomited a cloud of dirt through the grills. The pall of grime enveloped the perspiring girl.

"Oh hell," she raged and flung the half-empty coffee cup at the nearest air vent. The brown liquid was caught by the surge of regurgitated air and was spewed over the room—and Sharon.

With a feminine wail, she sank to the floor and sobbed with exhaustion and frustration.

Defeated and weary, her sobs stopped and she pulled herself up. The volume of mail through the station had taxed the efforts of two young and strong men. It was totally beyond the capabilities of a single woman, no matter how determined. Sharon shuffled into the control cabin and sank into a chair in front of the GPS Intersystem transceiver. She pulled the microphone from its recess and prepared to call for assistance from the GPS planetary main station on Adrian, the closest local space body to the station.

Sharon wearily punched the power button. Nothing happened. She pushed again. Still nothing. She pounded on the console in desperation. Still no power. Across the cabin, Steve sat up groggily in his bunk. Sharon jumped from her chair and went to his side.

"What's wrong with the long-range communicator, Steve?" she asked.

Steve peered at her with sleep-drugged eyes. He rubbed his face and tried to concentrate on what the girl was saying.

"The communicator, Steve," she pleaded, "what's wrong with it?"

Steve shook his head to clear it.

"Coil shot," he mumbled, "no spares in stock. Requisitioned them two months ago. No soap. Old Spleen Ire says gotta wait regular turn. To hell with 'im." He sank back onto the bunk.

"But how can we get in touch with them," Sharon persisted, shaking his shoulder. "We've got to have help."

"Write 'em a letter," Steve muttered and drifted back to sleep.

With a frustrated sob, Sharon trudged back to the sorting chamber. Every available rack was filled with waiting tubes. She began sorting. The approach alarm sounded and she raced back to bring in yet another carrier to go into the moorings. By this time she was moving on conditioned reflexes.

She had to have help. There was no determining how long the two men would be out of action. Perhaps, she thought deliriously, I should write the director a sweet letter and ask him to send us some help. Her hands automatically tugged a tube from the rack, her eyes vacantly noted the destination and her arms lifted it to the proper hopper.

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Suddenly she halted. There was a faster way than a letter.

No letter.

No letters for anyone.

No mail.

With a grim smile, she dropped the tube and surveyed the room. Again all racks were filled. When all of the shuttle locks were filled, fresh arrivals would be automatically shunted out into holding orbits by the station's command computer. The sub-space carriers were missiles of another matter. Failure to lock on to an approaching carrier would send the unmanned robot hurtling past the station and back out into space. Fail-safe programming would then drop the carrier back into sub-space for an alternative jump to another sub-station. The only danger lay in the thousand-to-one possibility of an approaching carrier coming into normal space on a collision course with the station. The odds were all in favor of the station.

Weary and beaten, Sharon left the room. The air conditioner now was pumping violently, as if ashamed of its earlier colic. The erratic thermostats had heated the atmosphere and the pungent fumes of fermenting brew now were carried to all parts of the station.

Sharon sniffed and then remembered the two open jugs in the galley.

Six hours later, Brian awoke, light-headed but cool. He sat up and swung his feet over the side of the bunk and tried to rise then sank back dizzily onto the bunk. The approach alarm was blaring. He staggered out into the cabin and over to the alarm. He switched off the noise and peered into the screen. There was no carrier in sight. Puzzledly he scratched his matted hair and beard and then trudged into the tiny shower cubicle off the cabin. Still in his khaki shorts, he turned on the water and shivered. A minute later, Jupiter Pluvius quit for the last time.

He stumbled wet and weak out of the shower but he was awake and felt better. Steve was still asleep and there was no sign of the girl. He headed for the sorting chamber. One look at the jammed racks and he began a frantic coursing through the station in search of the girl.

He found Sharon stretched out on the floor of the galley, sound asleep with a happy smile on her tear-stained and dirt-caked face. A jug and an empty tumbler lay on the floor beside her.

Brian grinned. "Son of a gun," he breathed, "she really is a human being after all."

Still grinning, he bent and hoisted the girl onto his shoulder. Weakened by fever, he staggered under her weight but managed to keep his footing and weave down the passageway to the ship locks.

He carried her into her ship and gently laid her on her bunk and covered her. "Sleep it off, kid," he said softly. "You and I have some talking to do when you wake up." He smiled and turned back to the station.

Four hours later, the ship from Adrian pulled into orbit and spacesuited men jetted across, to the emergency lock of the station.

Inside the station the air conditioner thermostat had continued to raise the temperature. Brian had the panels off the unit and was jury-rigging a thermostat borrowed from the galley oven when a slight drop in station pressure hinted at the arrival of the relief team in the air locks.

He continued finishing his temporary repairs on the heat unit and was closing the panel when the first of the men stepped into the control cabin.

"What is going on here?" the stranger bellowed. He glared at Brian and swept the control room with his eyes.

The bearded youth regarded the newcomer quietly. "I'm trying to fix this over-passionate heat control," he replied calmly. "What did you think I was doing? And more to the point, who are you to come barging into a Postal Station without permission?"

"Donovan," the man growled, displaying a shield, "Adrian Planetary supervisor." Three other men had crowded into the doorway behind Donovan and were shoving to see into the cabin. The supervisor spied Steve's recumbent form on the bunk in the cubby.

"Now by the gods," he roared, "you answer some questions. All hell has broken loose in the past four watches. No mail has moved out of this station in nearly twelve Standard hours, damn little before that. Six SS carriers have been picked up at alternate stations and we come aboard to find"—he glared around the cabin—"this . . . garbage dump."

"Good description," Brian mused politely.

"This garbage dump tended by a half-naked bum and a sleeping goldbrick and the sorting chamber stuffed with unhandled mail, to say nothing of the shuttles and carriers hanging to the fringes of the globular swill pot."

"Devastating excellence of vocabulary," Brian said admiringly.

Donovan's face blackened. "Now you listen to me, you young . . ."

"No!"

The exclamation crackled through the cabin like an overloaded relay.

"You," Sharon snapped, pointing her finger at Donovan, "listen to me."

She was dressed in the gray slacks and trim tunic of a GPS staff official. Her badge of office gleamed from its proper place on a properly curved chest.

Donovan stared at the girl and then choked and gulped.

"The first thing you're going to do, Mr. Donovan," she ordered, "is to get an autolitter from your ship and get that man out of here." She pointed at Steve. "He's ill and needs immediate attention.

"I'll put my ship into holding orbit so you can come alongside," she added. "And while I'm doing that, get

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some of your men working on the mail and get another crew to work cleaning up this station."

"Now just a minute, inspector," Donovan blustered, "I'm not . . ."

"That's right, Donovan," Sharon crisped, "you're not arguing and I'm not running a debating contest. That's an order, supervisor, so let's get moving. And when that's done, be prepared to drop planetwards with these men for hospitalization."

Brian grinned delightedly and sank into a chair at the console. Donovan glowered at the girl for a second and then began giving the necessary orders.

An hour later the relief ship drifted away from the side of GPS Sub-Station Orion One and then powered into space for Adrian. Donovan and four of his men remained aboard the station to cope with the log jam of mail and to bring Inspector Sharon Reilly's ship back to planetfall when replacement engine parts arrived. Inspector Reilly was aboard the relief ship, and more precisely, was sitting comfortably albeit illegally close, to Mail Handler Brian Aldridge. Both were occupying a narrow bunk inches away from the bunk where Mail Handler Stephen Prescott was propped up.

"I've already sub-ethered my preliminary report," Sharon said, "and I think there'll be some changes both in personnel and system when it gets to Commissioner Booth."

"Holy Jets," Steve breathed, "you went directly to the Big Boss? What about Old Spleen . . . I mean, Director Fleenhower? He was the one who sent us the 'Dear John.' "

"He gets a copy," Sharon snorted, "which ought to give him time to get his resignation in before he gets hauled up before the Board on your supply requests and on the condition of the equipment at the time you boarded the station."

"But what about the discrepancy report on the canisters?"

Sharon smiled. "I said it was apparently a leakage in the heater portal equipment." She looked at Brian. "What really was on those tubes?"

"Peanut butter and jelly," Brian grinned.

She laughed and squeezed his hand and the three of them sat there in companionable silence.

Sharon sighed and leaned her head on Brian's shoulder. "You know something," she said absently to Steve, "you make a fine batch of home brew."

"Holy cow," Steve bolted upright in the bunk. "That other jug. They'll find it."

Brian reached over and gently shoved the big man back to the pillow.

"Relax sonny, daddy took care of it."

"How?" Steve asked.

"Haven't you noticed?" Brian said smugly. "After Jupe quit on me, I still wasn't as clean as I wanted to be."

Sharon smiled softly and rubbed her cheek against Brian's smooth jaw.

"Oh no, not with my good homebrew?"

"I didn't even have to use soap," Brian added. ■

in times to come

Usually it's one-story-one-cover—but when we have a 120,000 word novel, like "Prophet of Dune," it seems appropriate to have two covers for a double-length yarn. In any case, that's what we've got coming next issue—a cover by Schoenherr showing a sandworm of Dune. Those are the creatures with mouths the size of a football field, you know . . .

The lead novelette in March, by J. T. McIntosh, we simply couldn't use on the cover. Not following this month's "The Mailman Cometh!" It happens to be titled "The Iceman Goeth!" Which I hereby swear is the author's original title, not something cooked up for the purpose, and it's a pure coincidence.

It involves some interesting questions that tend to be neatly ducked in most discussions of crime and criminology. It's legal to kill a man who is clearly trying to carve you up with a machete, or remove your brains with an axe . . . but what of a man who is engaged in a deliberate and highly efficient effort to destroy your mind. Not your brain—not the physical structure on which mind rests, but the subjective reality called "personality" or "self" or "mind"?

If a man is unexpectedly touched with a red-hot iron, and jumps away violently swinging a crowbar he's holding and kills someone—we don't consider it murder. After all, there are limits to what we can expect a human being to put up with!

But . . . what if he's a telepath? What constitutes "self-defense" then? And what constitutes "more than we can expect a human being to put up with"?

McIntosh has woven the elements of this problem—plus a nasty little left-over-from-the-last-war bomb!—into "The Iceman Goeth". ■ THE EDITOR

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So far as I can remember, the first time I saw Jerry Scott was during the big trouble in Dallas. Actually, we might have covered some of the same stories before but, if so, he never registered with me. There can be one whale of a gang of photographers around when news breaks these days.

I'd been spotted along the route with my Exacta. I'm a still man and just to clear this angle up I'll probably never be invited to join Magnum. I'm not Robert Capa and doubt if I'll ever develop into one. Not that I'm sour-graping. Fame and fortune just don't mean that much. Not after two wars and half a dozen revolutions and military revolts observed in these, our times.

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I had my Exacta with a 135mm telephoto lens, and it was bright enough that day for me to figure on shooting at two hundredth of a second. Frankly, without a tripod I have trouble holding with a 135mm and there's not much sympathy for camera shake in news photography. A high shutter speed is the only answer.

I'm getting away from Jerry Scott.

I saw Jerry immediately across from me, alone but with a fancy rig that I assumed was for newsreel or, more likely, TV. The fancy rig drew no attention either from me or others lining the route. Cameras might have been more or less standard in appearance a quarter of a century ago, but since then they've taken off in all directions. Remember when they used to call the 35mm a miniature?

In spite of my position, I didn't have particularly good luck when the crisis hit. I got jostled, for one thing. Not that I'm complaining. I decided years ago that I've used up my share of luck; I don't expect anything spectacular to be coming along. Oh, I got some highly usable pix, mind, but not what I should have got.

It was about six hours later that I saw Jerry Scott in the Langtry Bar, on High Street. It's one of these taverns that attempts to have a theme. The theme in this case being Judge Roy Bean's Law West of the Pecos saloon which used to be located in Langtry. There are some rusty Colts hanging up on the wall, and old Sharps'

Photojournalist | Mack Reynolds

Of course, if you can get the very best, the most spectacular and impressive of all great news shots—why who'd settle for less . . . ?

Illustrated by Robert Swanson

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buffalo gun, some photos of Judge Roy Bean, Wes Hardin, Wild Bill, Wyatt Earp and Calamity Jane. And the house rule is to call whisky *red eye* or *likker* and the customers *podner*. That sort of thing.

So I saw Jerry Scott. In fact, I sat at the stool next to him. The place was doing a land-office business. It was the first chance anybody'd had to get a drink since the big story broke and it was dollars to doughnuts we'd be back on the job in short order.

In the Langtry when the bartender's rushed he keeps count of the drinks you've had something like the French do. But instead of leaving a saucer before you, he just leaves the glass. When I arrived, Jerry Scott had four double-shot glasses in front of him. He was either taking them down fast or had been here a while.

I said, just to say something while waiting for my beer, "You must've hit the jackpot."

He looked at me.

Jerry Scott was—is—as average a looking man as you could have picked out in a mob of ten thousand. In his early thirties, he was average in all the usual statistics we go by, and dressed the same way. This was a man you would have to be introduced to several times, have some sort of mutual experience, before you would ever remember name or face. However, there was something in his eye.

That conveys exactly nothing. Let's put it this way. Have you ever looked into the eyes of a real primitive such as an African bushman or a Borneo Dyak? Or into the eyes of a man such as Hitler, Stalin, Tito, Chiang Kai-shek—those who dream of ultimate power? Or still again, into the eyes of a maniac? All different, of course; but all different from the eyes of you and me and the ordinary man who walks the streets.

Well, Jerry Scott's eyes were different still. There was a quiet, far away something. That doesn't convey much either, does it? I give up.

He said, "How was that?" and his voice slurred just slightly. He had been here for a time, all right. When the biggest story in the world was breaking all over town, he had been slopping up drinks in a bar. Though, Lord knows, he had been right on the spot when it happened.

I said, pouring the beer the bartender had brought me, "I noticed you just before all hell popped. You must've got a lens full."

"Oh," he said. "Sure Mike. That was luck, wasn't it? You with one of the syndicates?" He had noticed my camera and gadget bag and since this was a newsman's hangout had come to the obvious conclusion.

We talked for a few minutes, the way you talk in a bar, and then I took off to report. I remember thinking at the time that he was being awfully philosophical about it. This was the biggest news story since the war and here he was sitting in the Langtry.

The next time I saw Jerry Scott, he was once again well situated with his equipment for the second chapter of the biggest story I've ever photographed. In fact, he had so set himself up that his field covered the whole scene of action from behind the victim looking straight at our gemlike subject who was to pull the trigger a bit later. We nodded at each other, absently, and went about our business.

About two years later, I added another item of knowledge about Jerry Scott to my meager store, but didn't know it at the time. And the reason for that was I didn't know his name.

It was a bull session at Pat O'Brien's, in the Vieux Carre of New Orleans. There must have been a dozen or so of us, some from the local *Times-Picayune* but most of us from out of state, in town for the riots.

We had got around to stories we had flubbed, or pix we had fouled up through clumsiness, pure bad luck, or whatever. Some of them were pretty far out. Times when a photographer got excited and forgot to pull the slide out of his Speed Graphic. Times when you fogged a whole roll of irreplaceable film in changing it. That sort of thing.

And somebody mentioned a Jerry Scott who had evidently been working in South Vietnam. He had been the only cameraman on the scene when the Viet Cong had ambushed half a dozen American helicopters which were carrying an Under Secretary of State, the admiral of the 7th Fleet, two senators and some congressmen, all on an inspection junket. Right in the middle of it all he had ground away, as cool as a malted.

"I don't think I ever saw those scenes," one of the TV boys said.

The teller of the story said, "That's what I mean. With that exclusive he should have minted money. Jerry could have peddled it anywhere. He's a freelancer. But I haven't seen it either, so he must have flubbed it somehow. Couple of the helicopters destroyed, half a dozen airmen killed, but then they shot their way out killing the commies like flies. A major who was along told me about it."

I told them about the time I had, through inadvertence, run across Hollywood's current top sex symbol swimming in the altogether. I had taken a dozen surreptitious shots before I remembered that I had slow speed color in the camera instead of fast black and white, and that nothing I took could have had sufficient exposure to come out.

All this is build-up to running into Jerry again in Harry's New York Bar in Paris. You know the place. Goes back to the Lost Generation days. Hemingway and Scott Fitzgerald and that crowd used to hang out in Harry's. The draft beer is the best in Paris.

Jerry Scott—I still didn't know his name up till now—was at the bar, looking identically as he had in Dallas, years before. And just about as swacked.

As I was getting adjusted on my stool, the bartender said something to him softly, and Jerry said, "*Mèlez-vous de vos affaires,*" which comes out to mean something like mind your own business. The bartender, a slightly precious type, shrugged his shoulders and moved off to get the liter of Munich beer I had ordered.

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My memory for faces and conversations is fine. It came to me where I had seen him before and I said, "Dallas. At the Langtry."

He looked at me, his strange eyes misty from drink.

I had about decided that he was a mean drunk and at the stage where the nastiness was coming out and that it had been a mistake to say anything to him. But then he shook his head, as though for clarity and said, "Sure Mike, Dallas."

I said, "You must've had as hard luck as I did. Sitting right there in the catbird seat, it should've been perfect. But I never did see any of your shots, on TV, newsreel, or anywhere else. You must've run out of film, or something, right at the wrong time."

"You tellum," he slurred. "I stutter." He picked up a double shot of some kind of spirits he had before him and stiff elbowed it back.

The bartender brought me my heavy clay *mass* of lager and looked out the side of his eyes at Jerry. He obviously was of the opinion that my photographer colleague had had all he needed.

However, Jerry snarled, "*Une autre, s'il vous plait.*" The *if you please* part coming out as a nasty command.

The other shrugged a slightly feminine shrug again and reached for a bottle of Martell.

My bar neighbor said to me. "I'm Jerry Scott. Yeah, I remember you now."

I told him I was Guy McCord and what was he doing in Paris.

He told me vaguely he spent quite a bit of time in Paris and what was I doing here.

And I said I was in town for Number One's visit to DeGaulle's successor, the titular head of Common Europe.

I forgot what he said to that but my beer was running low and I ordered another and before remembering that Jerry was already fairly well loaded asked him what he'd have. He had another double brandy.

He must have been as lonesome as I was. The fact is, in the various times I have seen Jerry Scott he has always been alone. I have never seen him in company with either man or woman.

We talked nothing talk for a while and it only came to me later that largely he got around answering direct questions. I never even found out whether he did TV or newsreel material. As I say, I didn't notice it at the time.

I told him that I had just got into town, was staying at the Hotel Delavigne on Rue Casimir Delavigne, right off Rue Monsieur le Prince on the Left Bank, and that I'd figured on spending this evening seeing "The Cortés Story" which was playing over on the Champs Elysées. Liz Taylor was playing Malinche; James Mason, Cortés; and Alec Guiness was doing Montezuma. I had missed the show in the States and it was getting raves.

Jerry snorted and put away half his drink. "Nix," he said. "It's not worth seeing. Just one more of these Hollywood historical curds. They'll spend five million in cold kale building a barge to float Cleopatra down the Nile, and then forget to take the wristwatch off her arm when they film it."

I was beginning to feel the beer. Munich beer you feel by the time you've put down a couple of quarts.

I said, "This one is directed by Nick Beam. Really prides himself on authenticity. And McGivern did the script. Top man. I read somewhere he researched it for over two years before putting a word on paper."

"He probably researched it in Prescott," Jerry snorted. "Prescott didn't know what he was writing about."

Now the story of the *conquistadores* and the conquest of the Aztecs used to be one of my pets back when I was a kid. That was my idea of a real bit of derring-do. A handful of Spaniards overthrowing an empire.

I said grudgingly, "I'll admit most movie historicals have little resemblance to the facts, but there are exceptions. 'The Cortés Story' is supposed to be one of them."

"Horse feathers," he said. "This Nick Beam-McGivern team knows about as much about the Aztecs as I do about the far side of the moon." He grunted a sort of chuckle, in drunken inner-amusement. "Less."

I didn't particularly want to argue, but I said, "The show's a natural. With a cast like that, with Beam directing, and the script by McGivern, it's got everything 'Gone With the Wind' had."

Jerry said contemptuously, "When 'Gone With the Wind' was written, there were still survivors of the Civil War. And millions of words had been written by observers. This which-a-ma-callum who scripted the Cortés story was working in the dark."

He was beginning to exasperate me. I said, "The conquest of Mexico is damn near as well documented as the Civil War. Some four hundred and fifty Spanish adventurers knocked over the biggest empire in North America, defeating something like a quarter of a million Indian warriors. One of the biggest stories ever told."

He looked down into the emptiness of his glass and then up to locate the bartender who unsuccessfully tried to ignore him. "Hey, Percy, another double hooch here."

I had another beer, and he resumed the debate. "Story is right," he said. "Fairy story. Almost as bad as the accounts we have of the Greek-Persian wars. The Greeks won, so their historians got to write the history books. So for the rest of all time we get their good guys and bad guys account, with the noble Greeks butchering the nasty Persians by the hundreds of thousands." He chuckled again. "Do you realize that according to Herodotus Xerxes crossed the Hellespont with an army of a million men?"

I looked at him blankly. That's the way I remembered it, from high school history.

He grunted contempt, watching the bartender fill his cognac glass once again. "Logistics," he said calmly. "A modern general would have his work cut out getting an army that size through Thrace, even given trucks and trains. In Xerxes' day feeding and watering even a hun-

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dred thousand men with their plugs and other animals down through Northern Greece would have been impossible."

"What's this got to do with Mexico?" I said, my own voice probably on the nasty side by now.

He waggled a finger at me. "The Aztecs weren't an Empire. They were a federation of three tribes whose military domination didn't even completely cover the Mexican valley, an area smaller than Rhode Island. And they didn't have a quarter of a million warriors, either. The Pueblo of Tenochtitlan—Mexico City—had a total population of maybe thirty thousand, men, women and children."

I took down a generous quantity of the *märzenbier*, before returning to the fray. "All the historians, some of whom were there, give the city a population of about a million," I said, proud of my memory.

"Horse feathers," he said contemptuously. "Then they have to explain how a primitive people who didn't have a field agriculture but subsisted on gardens, and had neither beasts of burden nor the wheel, could feed themselves, in that limited space, in that number."

He finished off his drink. Actually, he didn't seem to be any tighter than when I had first arrived. He swiveled on his stool, to face me more directly.

"Those Spaniards were terrible liars," he pontificated. "For one thing, they had to impress the Emperor and his court, back in Spain, to get continued support. But they were liars anyway; most soldiers are when it comes to counting the enemy. When Coronado's men got up to what's now New Mexico they reported Taos a city of twenty thousand. Taos then, and still today, never had a population of more than one thousand."

I decided it must be a real hobby of his, particularly since he was getting so dogmatic and heated about what started off as no more than a voiced desire on my part to see a movie spectacular. But by this time I was feeling my beer, too.

I said, "I don't care what you say, it was still one hell of a conquest when Cortés and his four hundred and fifty men defeated the Emperor Montezuma and captured Mexico City."

"Nix," he said disgustedly, waving for the bartender once more. "Not emperor. Montezuma was a *Teuchtli*, a democratically elected war chief. The Aztecs weren't far enough along in social evolution to have such feudalistic institutions. They were tribesmen. And Cortés might have started with four hundred and fifty men, but by the time Tenochtitlan fell, the Spaniards in Mexico were thick as lice. When the word spread about all the gold, the Spanish zeroed-in like crazy. Why Navarez alone brought nine hundred men, eighty of whom were cavalry and eighty more harquebusiers. And every time a ship landed at Vera Cruz, not only the adventurers who had come to join up, but all the crew would be conscripted for the Spanish forces. But that's not it."

I could feel the fog beginning to roll in, but I was getting more belligerent as childhood heroes began to take on feet of clay.

"What's it?" I demanded.

"The Spanish didn't conquer Mexico City. The other Indians did. The Aztecs had been exploiting them, taking their young people for sacrifices, for decades. Cortés and his boys were fresh from Europe's intrigues. Machiavelli's times. They made themselves the rallying point for every Indian for a hundred miles around who had his dander up against the Aztecs. When the final assault took place against Tenochtitlan, the Aztecs were actually outnumbered."

Märzenbier is one of the strongest brews in the world. It runs eighteen per cent and you simply don't put it away in the quantities I was drinking.

I said, "Nuts. You don't know what you're talking about, Jerry. Biggest victory . . . all time. Ol' Hernando Cortés, and handfulla men, took 'em all."

The cognac he had been putting down was at long last catching up to him. His tone was getting as nasty toward me as it was to the long suffering bartender. He shook his head in contempt.

"Nix. There was oney . . . only one time they were really in the dill, on the *Noche Triste*, when the Mexican ran 'em out of the city."

"In the dill?"

"Sure, Mike. The situation'd really pickled. Got out by skinna ofa teeth. But when they come back they outnumbered Aztecs, two ta one."

"Nuts. Don't know whatcha talking about," I said.

"Vuz you dare, Sharley?" I could hear his voice from a distance.

Alcohol hits different people different ways. I know men who can drink all evening, seemingly sober. Be able to carry on a complicated discussion. Perfectly able to drive home. However, comes the dawn and they don't remember anything that happened or was said, after about the fourth drink. They just blanked out, so far as memory goes.

It's almost the opposite with me. If anything, drinking sparks my memory. It becomes almost total recall—to a certain point. But then if I get too far along the fog rolls in and all goes blank. When it rolls out again, anywhere from half an hour later, to next morning, memory resumes all over. The period when the fog was in, remains a blank, although friends will tell me I was comparatively lucid and navigating without aid.

At any rate, when the fog rolled out, I was in what was evidently Jerry Scott's apartment.

Somebody had mentioned once that he was a free-lancer. I still don't know who he sells his stuff to—and, in a way, don't want to know—but unless he has private resources, he sure does well by himself. Paris apartments are as high as any in the world, but Jerry had a pad I couldn't have afforded in Madrid.

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There was a tall glass of beer next to me, on a cocktail table, and I was seated in a heavy armchair. The lights were low and we were watching a screen. Not a TV screen, the portable sort of deal your color slide addicts bring out to show you the half-baked shots they took of their brat kid on their vacation to Yosemite. Only this one wasn't being used for slides. It was showing a 16mm—I suppose—battle scene.

I shook my head for clarity.

It wasn't a movie. That is, it wasn't a play complete with plot and movie stars. It was more like a news reel, or, better still, a documentary.

I finally came to a realization of all my surroundings and what was going on.

Jerry Scott, who was at some kind of a projector, was saying, ". . . There. See coming over near the causeway? That brigantine with the cannon mounted on it. The Spanish built them in Tezcuco, on the other side of the lake. This is toward the end. Largely, the Spanish stay back and shell the city, and clear the causeways with grapeshot. The Tlascalans and Tezcucans and the other Indian allies do most of the hand fighting, with the Spanish musketeers and crossbowmen keeping up a heavy fire from behind. When there's enough clear space, the cavalry can charge. The Aztecs are still scared to death of the horses."

There was a close-up on the screen. An unshaven, iron helmeted Spaniard, his face in snarl.

Jerry Scott said, "Now this guy's the cat's whiskers. Pedro de Alvarado. Look at that face. An animal."

Another close-up.

"Bernal Diaz. A cloddy if there ever was one."

The scene changed to a group of Spaniards servicing a brass falconet, or whatever they called those little cannon. They wore iron helmets, but their clothes didn't seem to jibe with . . .

Jerry was saying, "See? The popular conception is a group of Spaniards on horseback and dressed in full armor, or at least mail. Actually, they found the Indian quilted armor more effective, especially in that climate. But here's what I wanted you to see."

The scene had shifted to buildings. Evidently, the cameraman was now on a boat. The buildings were part of the city. Already, I realized that this was the biggest set I'd ever seen. Bigger than the Forum there in Cinecittá in Rome, when Twentieth-Century-Fox made Cleopatra some years ago.

"Community houses," Jerry was saying, argumentatively. "Like the Zunis and Hopis still have in the Southwest. Pueblos. There wasn't anything like them in Europe, so the Spanish thought they were palaces. Up to a thousand Indians will live in just one of them. When the Spanish saw the war chief, Montezuma, living in his clan's community house, they figured he was a king and all the others were nobles waiting upon him, or servants."

Set?

It couldn't be a movie set. It was simply too big.

I grabbed my glass of beer and drank deeply, my eyes still popping at the screen.

I dimly recall some other scenes. Thousands upon thousands of Indians, women as well as men, filling in the canals of the city while the Spanish, at a distance, knocked down walls and fortifications with their guns, to supply them with rubble.

"There're your conquerors of Mexico," Jerry Scott's voice said. "Cortés promised to let them loot the city. But once the last of Guatemozin's warriors were eliminated, the Spanish decided to keep the looting to themselves."

I finished the beer. There was a quart bottle nearby. I filled the glass again, my eyes still bugging the screen.

There was an explosion of forty or fifty cavalrymen into a large square. Following them came a mass of yelling, screaming Indians, thousands of them, and following them, more Spaniards, running and carrying crossbows and muskets. I say screaming, but there was no sound. This whole thing was silent. For the briefest of moments I wondered if it could be one of the early DeMilles. But no. They weren't up to this realism in DeMille's day, and not even he built sets of this magnitude.

They came swarming into the square and a thin line of other Indians fought a hopeless delaying action against the horsemen of whom they were obviously terrified.

With torches, the invading Indians dashed into the king-size adobe and stone buildings. Smoke started pouring from wooden roofs.

Jerry was saying, the slur of alcohol still in his voice, "Remember the Marine song, 'From the Hall of Montezuma to the shores of Tripoli'? Well, Tripoli has shores, but Montezuma's houses didn't have halls. Halls have nowhere been found in Indian architecture. They just weren't that advanced. The nearest thing to it has been some external corridors found in ruins in Central America."

I poured more beer. The fog was rolling in again, but I brought the glass to my mouth shakily.

"Ah, but here's the corker," he was saying. "This is what I was looking for. Shot taken earlier. Here's Montezuma having dinner. No chairs. No tables. American Indians didn't have either. Does that look like an Emperor to you? They didn't have knives and forks, either."

The fog was rolling in again.

When it rolled out, it was morning and I was slouched, completely dressed, in the same chair in which I'd last remembered watching Jerry Scott's movie. I won't describe such items as the bottom of the bird cage mouth, the butterfly stomach, the anvil head. You've been through it.

Jerry was sprawled on the couch, his mouth half open as he snored.

Later, I shook him awake.

"Hey," I said. "Number One's going to arrive this morning at Orly Field. That's what we're here for."

"Nix," he growled, closing his eyes again. "Scram, and

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let me sleep. Nothing important's going to happen till tomorrow."

I spent only another minute or two, making sure he really didn't want to come. I had to make time back to the Hotel Delavigne to get my equipment and then take another cab out to Orly. Jerry Scott might be a freelancer who could afford to let a hangover keep him from bothering with a top story, but I had a boss. In fact, I had bosses.

I could have saved myself the dither. Number One's plane was a full hour late. In fact, France's Chief of State, indignant at the delay, finally stomped off. It wasn't a secret that he bore no love for the Kremlin's current tenant, anyway, but this had been the first time they were to meet at this type of official get-together.

Newsmen and photographers stood around, shuffling their feet.

I stood around, too, unhappily, wishing I had a very cold can of one of the lighter beers of the type you get from Denmark. I was reformed. No more of the heavy, super-strong, lager from Munich. But I could have sure used a cold Tuborg or Carlsberg.

Pop Hamling was standing next to me, his battered old Graphic held by its leather side strap. Others have graduated to Hasselblads, others have taken to the Bronica, to Rolleis, to Leicas or other 35mm cameras. Old Pop sticks to his Graphic.

He looked at me critically. "Guy," he said, "you want to stay away from the hard stuff. Your generation doesn't seem to be able to handle it. Hooch is for heroes, not pantywaists."

I didn't have the courage to tell him I'd achieved this hangover on beer. But his words brought something back to me.

I said, "Pop, you've been around a long time. When did they used to say hooch?"

He thought about it, his sagging face not really expressing interest. We were both talking just to kill time. "Just before booze," he said. "It got to be booze about 1930, just before Roosevelt. In the early days of prohibition, we called it hooch."

"How about horse feathers?" I said.

He looked at me, wondering, I suppose, just how far over the hangover I'd gotten. "Horse feathers?" he said.

"Like we used to say baloney, when I was a kid, or nertz."

"Oh," he said. "Oh, yeah. Horse feathers." He grunted in humor. "Back in, oh, the late twenties, I guess. The Barney Google comic strip. That's what it used to be before Snuffy Smith came along and became a character more popular than Barney Google and his horse Sparkplug."

I waited patiently.

"Anyway," Pop said, "Barney Google started a fad that spread through the country. He formed the Billy Goat Society, the members of which said, as a password, O.K.M.N.X. and had a special handshake. And they said horse feathers."

I thought about it. "How about the Cat's Whiskers?"

"Cat's Whiskers? That's before my time. I remember my mother saying it. The Cat's Whiskers, the Bee's Knees and the Cat's Meow. Must have been back before the First War. What's all this about?"

"I don't know," I said. "When did they used to call a sissy, Percy?"

He'd been scanning the sky, trying to locate the dot that would become the jet from Moscow. "Percy," he chuckled again. "I'd forgotten that one. Back when I was a kid. Early twenties. Oh, I guess it goes back further than that. You know, 'Penrod and Sam' days."

"Cold kale?" I said.

"Meaning money? That's from the twenties. They say loot, now, or bread."

"How about *in the dill*, evidently meaning something like *in the clutch?*"

"Hemingway always used to be using *in the clutch*," Pop said. "But I never heard *in the dill*. I don't get it."

"The situation had pickled," I said. "They were in the dill."

"Oh," Pop Hamling said. "That's a new one. Beatnik?"

"I don't think so," I said. "How about curd?"

"You mean crud."

"No, I mean curd. Evidently used about the same way, though."

"A curd is soured milk. Something like cottage cheese, isn't it?"

"I guess so. But I heard it used as slang. And what in the devil does *Vuz you dare, Sharley* mean?"

He stared at me a minute, scowling, and then chuckled his old sour chuckle again. "That was Joe Penner, back in the 1930s. No, I take that back. Joe Penner used to say, Wanta buy a duck. The Baron Münchhausen said, Vuz you dare, Sharley? The comedian's name was Jack Pearl, or something like that. He'd tell some outrageous lie, and then when his straight man, Charley, caught him up on it, he'd say in this phony German accent. Vuz you dare, Sharley? and the straight man would have to admit he wasn't. The phrase swept the country for about a year or so."

I couldn't place the reason why, just as yet, but a ball of strangeness, of incipient fear, was beginning to make itself evident in my stomach. My intuition was outstripping my thinking.

I said, "Listen, do you know one of the boys named Jerry Scott?"

He looked at me. "Jerry Scott? Is he still around? I haven't seen him since the war. The original bad-luck kid, from what I heard. I didn't know him very well."

"What war?" I said, my voice even.

"The Second War. I met him around a couple of times. Not a very friendly Joe."

"This couldn't be the same one," I said. "This Jerry Scott must be in his early thirties. He would have been just a kid during the Second War."

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"Well, this guy was kind of an accident prone when it came to covering some story. He took newsreel stuff, I think. Anyway, he was there when Mussolini was captured by the partisans and shot. Right on the scene, grinding away when they shot the Duce and that mistress of his. Later on they strung them both up by the heels, but there were other photographers on the scene by then. But Scott must have fouled it up, some way. I never saw any of his shots. He would have made a fortune if they'd come out, and copped the Pulitzer to boot."

I ran my tongue over suddenly parched lips. "Hear of any other top news events he was present at and then managed to flub getting the shots?" I paused, before adding. "Or at least, they were never released by any of the regular syndicates or agencies?"

He scowled at me. "That's a funny thing to say. Hey, here comes Number One."

We both scurried to take our stands and for the time I forgot about Jerry Scott and the fact that he seemed to speak the slang of half a dozen periods as though all of it were current.

Before I leave that point, though, consider it for a moment. Have you ever noticed how completely a colloquialism leaves the language, once it is dropped? For instance, how often do you hear someone call a woman a *frail*, Or money, *mazuma?* Do you ever say a thing is *nifty*, or murmur *Oh, you kid*, when you see a pretty girl?

But somehow what really struck me was that *in the dill* bit. An impressive little expression, but from what period did it come? That, and the term *curd*.

Jerry Scott had been right. Nothing important happened at Orly Field when Number One and his group arrived. The Soviet chief of state's French counterpart had already gone on home, or wherever, and the ceremony of greeting was on the brief side.

However, the next day, Jerry Scott, complete with his fancy camera, was right on hand.

You know the story. Number One was to lay a wreath on the grave of the Unknown Soldier, right there where the eternal flame burns under the Arc de Triomphe. Lay a wreath, hold a moment of silence, and then say a few words for the sake of TV, radio and newsreel. Standard routine. Everybody who was anybody in French and Common Europe officialdom was there and one whale of a gang of diplomats.

The Place de Etoile, in the center of which stands the Arc de Triomphe, was packed and the crowds backed down the Champs-Elysées in one direction and down the Avenue de la Grande Armée in the other. It was the first time the current Number One had left Moscow and everybody wanted to see him in person. Though, Lord knows, he's no beauty.

And there, as I say, all set to shoot, was Jerry Scott. He had maneuvered himself off to one side of the majority of we news and TV men, and at first I couldn't figure out why. The two times I had seen him in action, there in Dallas, he had seemed instinctively to have chosen the exact best spot for the action.

At first, I couldn't see why he had picked his spot, but at second I did.

He was within a few feet when, in the midst of Number One's admittedly provocative little speech which followed the placing of the wreath, DeGaulle's successor grabbed the husky Ukrainian by the lapels of his coat and slapped him across the chops.

Like I say, you remember the story. It only happened a few days ago. In fact, it's still in the process of happening. What the final result will be, is up in the air.

What worries me is this.

Jerry Scott never seems to bother with any except really first-rate news stories. Absolutely first rate. Not just ordinary front-page stuff, important for a day, but the greatest stories of our century.

I'm trying to keep from adding, of *all* centuries.

What I'm really trying to say is, what was so all shakingly important about that slapstick scene at the Arc de Triomphe? What's going to develop from it, now that Number One and his gang have all gone back to Moscow in a huff?

I'm scared. ■

THE ANALYTICAL LABORATORY | NOVEMBER 1964

PLACE	STORY	AUTHOR	POINTS
1.	Gunpowder God	*H. Beam Piper*	1.95
2.	Sweet Dreams, Sweet Princes (Pt. 2)	*Mack Reynolds*	2.80
3.	Guttersnipe	*Rick Raphael*	3.37
4.	Bill for Delivery	*Christopher Anvil*	3.38
5.	Gallagher's Glacier	*Walt and Leigh Richmond*	3.84

THE EDITOR

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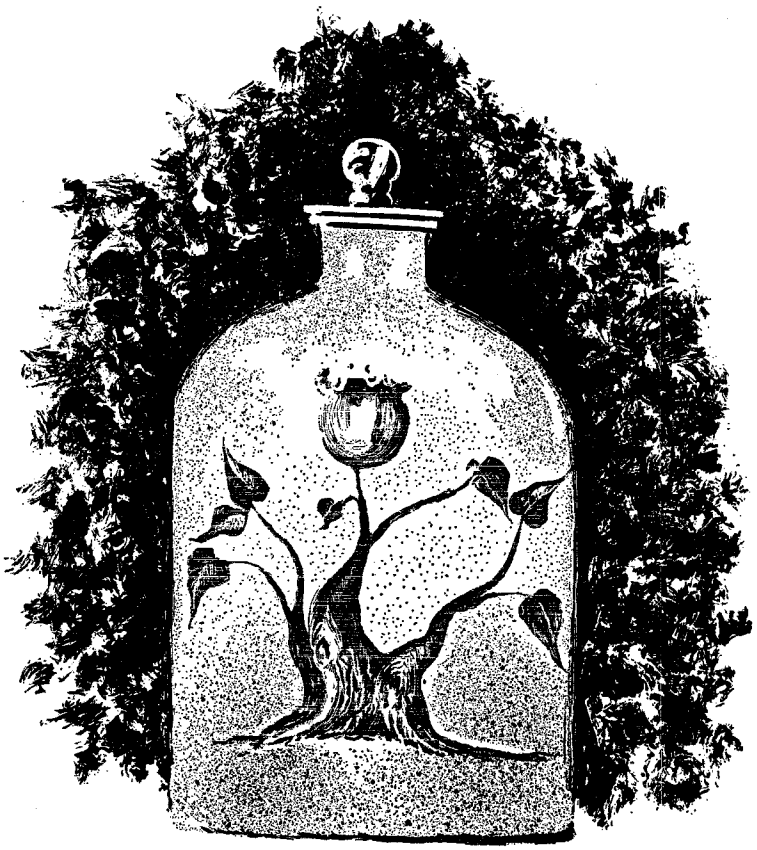

the pork chop tree

There's the old saying that "hard work never hurt anyone." Now the inverse corollary of that . . .

JAMES H. SCHMITZ

Illustrated by Hector Castellon

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In Research Laboratory 3230 of the Planetary Quarantine Station two thousand miles out from the world of Maccadon, Professor Mantelish of the University League stood admiringly before the quarantine object which had been unloaded from his specimen boat some hours ago. It had been aroused from the state of suspended animation in which he had transported it back to the Hub from its distant native world.

It was a plant-form and a beautiful one, somewhere between a tree and a massive vine in appearance, its thick, gray-sheened trunk curving and twisting up to a point about twenty-five feet above the conditioning container in which it was rooted. Great, heart-shaped leaves of a deep, warm green sprang from it here and there, and near the top was a single huge, white flower cup. A fresh and pleasant fragrance filled the research laboratory.

Mantelish, an immense old man, scratched his scalp reflectively through his thick white hair, his gaze shifting from this point to that about the plant. Then his attention centered on a branch immediately above him where something had begun to move. A heavy, tightly coiled tendril swung slowly out from the branch, unwinding with a snaky motion until it lay flat in the air. Simultaneously, three new leaves, of a lighter green and smaller than the mature ones about them, unfolded along the tendril's length and spread away from it.

"So it started right in growing again as soon as you woke it up," a voice said behind Mantelish.

He looked around. A slim, red-headed, good-looking girl in shorts had entered the laboratory and was coming over to him.

"Yes, it did, Trigger," he said. "As I suspected, it will speed up or slow down its growth and reproduction processes in accordance with the area it finds available to it."

"Until it's covered most of a planet," Trigger said. "Pretty ambitious for a tree!"

"It certainly is a highly prolific and adaptable life form," Mantelish agreed. He added, "Do you happen to know where Commissioner Tate is at the moment?"

"Dissecting one of the specimens from the other boat." Trigger said, studying the tree. "I stopped by there just now, and he told me not to come in . . . what he was doing was pretty gooey and I wouldn't want to see it. He said he'd be along in a few minutes. There was something he wanted to find out about the thing." She nodded at the tree. "Have you fed pretty baby those slow-down hormones you were talking about?"

The professor consulted his watch, said, "An hour and a half ago. They're having the expected effect. The new branch you saw it put out is the only indication of growth it's given during the past twelve minutes."

He put the watch away, added, "Of course, we have to be absolutely certain that its growth can be controlled at will before the species is released for the general use of the public. And, more importantly, that the steps I have in mind to deprive it of its methods of random proliferation—in particular its propagation through the release of air-borne seeds—are completely dependable. Otherwise, our beautiful tree might become a definite nuisance on any Hub world to which it is introduced."

Trigger smiled. "I can see it wouldn't be at all convenient to have it around full size in most places! But it's impossible for me to imagine anyone considering it a nuisance."

Mantelish scratched his chin. "Nooo-oo," he said slowly. "Nonetheless, it would be unwise to allow it to spread to the point where it began to crowd out native species. And, in many instances, it would undoubtedly be capable of doing just that . . ."

"Everybody who has a garden is going to want to have one of them," Trigger said. "You hear that, pet?" She stepped out on the conditioning container, and ran her palms lightly up along the tree's trunk. "You're not only about the most completely edible thing around," she told it, "and you're not only beautiful—you also have a wonderful personality! You're going to be a great big fad everywhere in the Federation."

The professor laughed. "You're crooning to it, Trigger!"

"I feel like crooning to it," Trigger said. "I feel very affectionate toward it! Did I tell you that on the trip back, when it was in stasis and I couldn't go near it, I'd dream about the trees every few nights?"

"No."

"Well, I did. There I'd be climbing around in that wonderful forest again, or stretching out for a nap on one of the really big leaves—and they curl up around you so nicely when you lie down on them!" She smiled at Mantelish. "Matter of fact, I think I'll climb up on baby right now!"

He chuckled. "Go ahead. I, uh, was aware of similar inclinations several times this morning. However, with my weight—"

"If you ate just what you got from the tree for a while," Trigger told him, "you'd trim down fast!" She bent at the knees, looking upward, leaped, caught one of the branches above her and swung over to a level section of the main trunk. She stood up, grinned back at Mantelish. "See, professor . . . it's easy!"

"For you, Trigger!" Mantelish said enviously. "I'm afraid I lack the agility."

Trigger walked along the trunk till it curved up again, then put a hand on either side of it and went up all-fours style like a cat to the next level point. She straightened, reached for the big white flower cup overhead, drew it gently down toward her.

"When did the bud open?" she asked.

"Almost immediately after I brought it out of stasis," Mantelish said, watching her. "Is it in seed?"

Trigger peered into the cup.

"Full of seeds," she reported. "But they're still soft and unfeathered . . . Poor baby! They're not going to let you

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puff those away on the wind. You have to become civilized now! *Aha!*" She reached suddenly back of the flower, plucked something away from it.

"What is it?" Mantelish asked.

Trigger held up a shiny black globe between forefinger and thumb.

"A bunch of the black cherry things! My favorites!" She released the flower, sat down sideways on the trunk, legs dangling, a dozen of the cherry things in her left hand. She popped one into her mouth, munched, eyes blissfully half closed.

"*Very* good!" she observed. "Oh, by the way . . ."

"The reports on the samples I sent back?" Mantelish asked. "Yes, they're here. They confirm officially what we already knew . . . almost every part of the tree has a high nutritional value for the human organism. Even the trunk is given a rating equivalent to that of the noble fungi; but, of course, it is greatly surpassed in that respect by various types of the blossoms and fruits."

"And if you're thirsty," Trigger said, "you can drink sap from the creepers. Then, every few days, there's something new coming out, so you could get your meals from one tree all your life and never get tired of the diet! The food industry is going to hate this, I think . . ."

Mantelish grinned, said, "There are also other attractions."

"Yes. It's very decorative. It makes temporary hammocks out of its leaves for you, and the big trees even have cubbyholes in the trunk where you can sit when it's raining too hard outside. The special thing though is that you have the feeling you're welcome to everything—that the trees like people and *want* them to be around."

"Well . . ." Mantelish cleared his throat. "I have had that feeling on occasion. Or thought I had. And others have reported it. However . . ."

Trigger said, "I had the feeling very strongly all the time we were there." She patted the trunk beside her. "And I'm getting it—very strongly—from baby right now. It's glad I'm sitting up here with it again."

"That seems a little fanciful, Trigger," Mantelish said. "Feelings of that nature can be produced by the imagination, you know."

"Yes, I do know that," Trigger said. "But I don't think it's imagination in this case. And it wouldn't be too surprising, would it? There the trees are, the most highly evolved form of life on their world—in fact, probably the only form of life there you could call highly evolved. Everything else we saw was about as dull as a creature can get."

"Compared to their counterparts on more competitive worlds, those other organisms might seem uninteresting," Mantelish conceded. "However, they are simply overspecialized. They show the apparent simplicity of true parasites. With the tree's forests almost covering the planet, there would be no need, of course, for other species to develop beyond the point where they could obtain their nourishment from it."

Trigger said, "And the trees don't seem to mind feeding all the rest of the planet, or they wouldn't be so edible. But I think they would like more interesting guests around for a change, and that's why they try to let us know we're welcome. The Federation should make that whole world a vacation land, professor! They could put big, fast ships on the run and bring people in by the thousands for a month or so. Families with children, honeymooners, and especially people who feel run-down or tensed up—it would be wonderful for everybody! The meals would be free, and the trees would love it . . ."

She looked over at the entrance door, smiled, said, "Hi, Holati! We were discussing . . . anyway I was . . . what could be done with the tree world."

"That's a good question," said Commissioner Tate.

Trigger stood up and half walked, half slid down along the tree's thick serpent trunk to the ground while Holati Tate came across the laboratory toward them. The commissioner was a small, lean, elderly man, deeply tanned and nattily dressed, who had organized and headed the Federation expedition investigating the planet of the trees. He'd accompanied Professor Mantelish and Trigger back to the Hub in the expedition's second specimen boat, crammed with assorted organisms for the biologists.

"Got several bits of news for you," he said.

"What about?" Mantelish asked expectantly.

The commissioner glanced up at the tree. "In a way," he said, "about our little friend here. A transmitter call reached my boat from Expedition HQ while we were coming in on Maccadon, around six hours ago. One thing they reported was that three members of the paleontological team we left digging around down there have walked off the job."

"Walked off the job?" Trigger said.

"Yes," said Holati Tate. "That was a few days ago. They left a note which said, in effect, not to bother them. They'd decided they'd found the world of their dreams, and they weren't coming back."

"You can hardly blame them," Trigger said.

"No. However, I've notified the Space Scout Patrol Command. They have a squadron cruising about they can get over to the planet in under a week with instructions to pick up our three strays and bring them back to the Hub. They won't have gone far, of course." He smiled briefly. "All they want to do is prowl around the trees and be happy. They'll be found somewhere within a mile of the camp."

"I suppose so," Trigger said hesitantly. She paused, frowning, went on. "But do we really have any right, legal or otherwise, to interfere with them if that's their decision? It's not an off-limits world. Why shouldn't they just be considered the first settlers there? After all, human beings would get everything they needed from the trees to live as well as they could anywhere else."

The commissioner said thoughtfully, "So they could. Well, there's the second part of the report I had. The

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paleontologists haven't been looking for anything of the kind, of course, but they came across a couple of ruins and have begun to uncover them."

"Ruins?" Mantelish repeated, surprised.

"Yes," said the commissioner. "Those three wouldn't be the first human settlers on that world, Trigger. The ruins are about eight hundred years old, and there's enough to show quite definitely that they were once occupied by human beings.

"I started thinking about that. It would be one of the groups which pushed out from the Old Territory during the period the Hub was being settled. Interstellar drives and transmitters weren't too efficient at the time, so I got in contact with the Space Charting Bureau and had them run me a check on an area around the trees' world representing a week's cruising range for us. An early colonial group that wanted to settle a number of worlds but still stay in contact among themselves shouldn't have scattered any farther than that.

"A couple of hours ago, the Bureau called me back. They had the information I wanted. The charting work done in that sector indicates two other terratype planets within the area I had inquired about are also covered with a blanket of apparently homogeneous forest vegetation."

Mantelish nodded. "With its inherent growth capacity unchecked, it would be likely to cover the land areas of any world where it could live very rapidly. There is no question about that."

"But why the ruins?" Trigger asked, a touch of uneasiness in her voice. "I can see that the colonists who found the tree would have planted it on the other two worlds where they had settled. But even eight hundred years ago, they must have had any number of ways to keep it out of areas where they didn't want it to be."

"Of course," Holati Tate agreed.

She looked at him, her face troubled. "You're thinking of the three men who walked off the job back there?"

"What else? They'd never be settlers in any sense, Trigger. They've simply gone native . . . or would if we let them do it. The colonists did the same thing. They deserted their settlements, went to live among the trees."

"But not *all* of them!" Trigger said protestingly. "Some people might want to spend their lives like that, and if that's what they like, why not? But a whole group of colonists doesn't simply leave everything they've built up and go away!"

"Not under normal circumstances," the commissioner said. He pursed his lips, was silent a moment. "That feeling of yours that the trees want us around," he went on. "The evidence is that you're right. They want us around, and they do something about it. It hadn't occurred to me to look for the symptoms before, but I'd say now that in the short period of time we were there, all of us who were in regular contact with the trees—eating the fruit and so on—have become somewhat addicted to them."

"Addicted?" Trigger repeated. She looked up at the tree, back at the commissioner, her face startled, then turning reflective.

"Yes," she said slowly at last. "I've become addicted to them, anyway! Slightly. Not just the fruit. It's liking to be near them, the feeling that they like you to be there, that they're beautiful, friendly things . . ."

"I know," he said. "In the case of our AWOL paleontologists, those feelings simply grew strong enough to override their ordinary good sense. and the colonists, who were constantly surrounded by the trees, had no chance of escaping the effect indefinitely. We'll have to assume they all succumbed to it."

Trigger said after a moment, "Then I wonder what happened to them. You'd think with the trees to look after them, their descendants would still have been there when we arrived."

The commissioner made a small grimace.

"I wondered about that, too," he said. "And then there was the question of whether the tree was native to the world where we found it, or brought there from one of the other two."

Mantelish frowned.

"The tree is native there, obviously, Holati," he said. "The fauna is so completely adapted to it that—" He paused, scowling at the commissioner. "Unless . . ."

"Yes," said Holati Tate, "that was my thought. In eight hundred years, the assortment of creatures we found there couldn't have adapted so completely to living with the trees as it has, become so dependent on them, unless the life form which likes to have other life forms around has methods beyond simple addiction to keep them with it permanently.

"I took three of the specimens in the other boat apart on a hunch. The third of them was the thing which looks a good deal like a limp, gangly, hundred-pound frog. It's practically blind and it has about the same amount of brains as a frog. Of course, it doesn't need much intelligence to crawl from leaf to leaf and along the branches. But most of its internal arrangements are still essentially human."

There was silence for a moment. Then Trigger said faintly, "But that's horrible!"

"From our point of view," the commissioner said. "From its own, if it had any, the creature probably would feel it was leading a very comfortable and satisfactory existence." He shrugged. "The planet will be quarantined at once, of course. So will the other two worlds if the trees are found on them. I'm rather sure they will be."

Trigger looked up at the tree again, swallowed, said, "Do you think they'll all have to be killed?"

"There may be another answer to the problem than exterminating them or keeping their worlds quarantined indefinitely," the commissioner said. "I'd like to see one found. After all, the only charge against the trees is that they're entirely too hospitable to every other kind of life." ■

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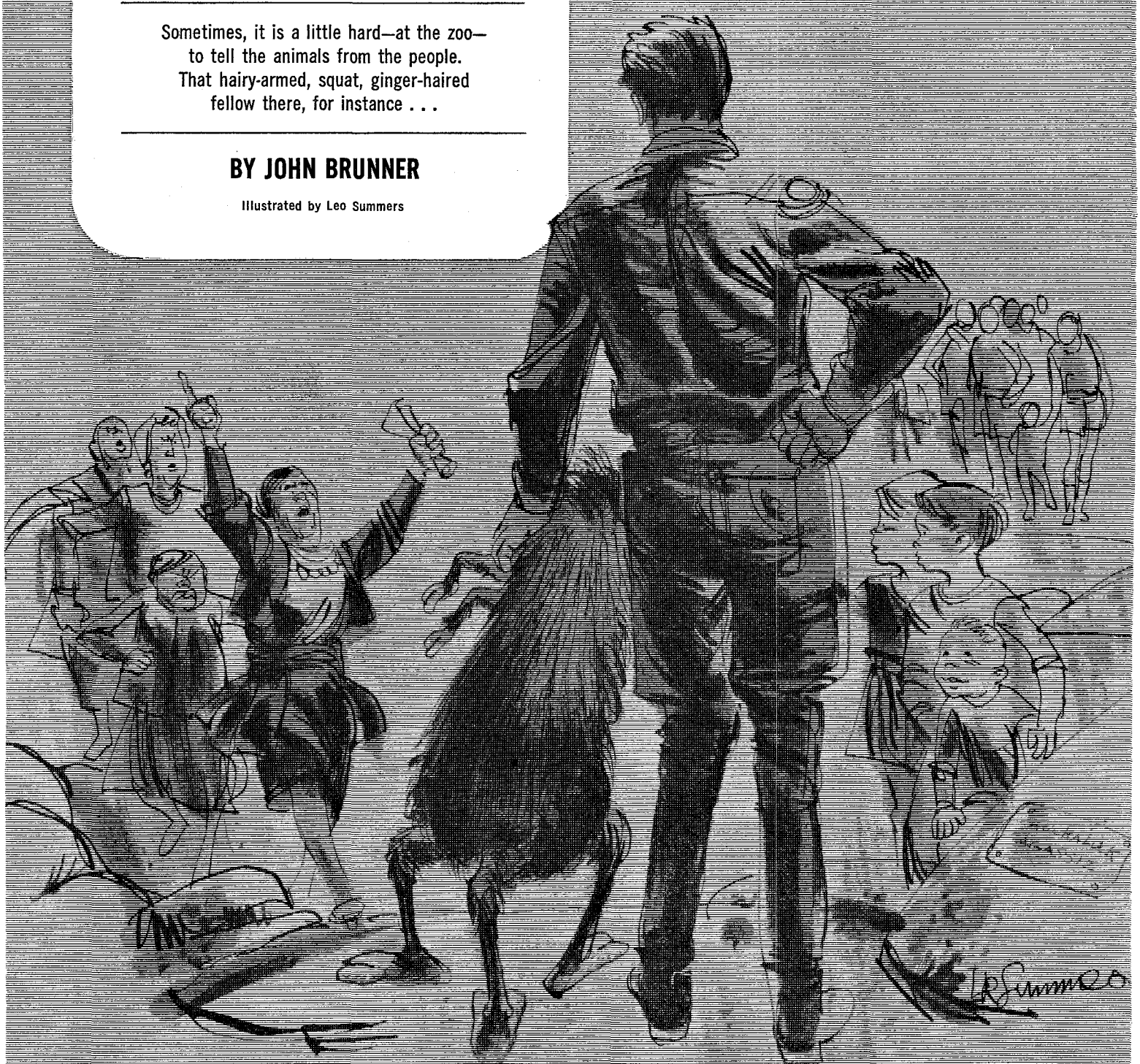
Coincidence Day

Sometimes, it is a little hard—at the zoo—
to tell the animals from the people.
That hairy-armed, squat, ginger-haired
fellow there, for instance . . .

BY JOHN BRUNNER

Illustrated by Leo Summers



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The sun rose over the rim of the ocean to tint the sky and also the domed roofs, pontoons and other visible surfaces of NASEEZ with a pearly pinkness. Nigel Stonerley paid no attention.

Time passed.

Certain mechanisms within the structure of NASEEZ stepped up their level of activity to full day-time intensity. Others, set to follow a different time-schedule, ignored the arrival of a new local day. Nigel Stonerley, even without being adjusted to a different time-schedule, copied the latter example.

Time passed.

Finally, an alarm over the Stonerleys' double bed joined the roster of mechanisms responding to the sunny morning, and was in its turn disregarded. Nigel Stonerley was very good at disregarding the alarm.

Shortly, however, a determined elbow jabbed him in the ribs, and he had to come close enough to waking to resist the nudges. He put both arms around his petite, dark, power-packed wife Midge and uttered an optimistic grunt. Seven years of marriage enabled her to translate: "Five more minutes?"

"No," Midge told him, and prodded again. "Galaxy, Nigel! Why do you have to spend so much of your time asleep?"

" 'M rehearsing," he mumbled. "Wanna adjust to a thirty-hour day like Chuckaluck had to get used to ours."

"Chuckaluck did his adjusting after he got here." Midge kicked out with bare toes. "Move, you inert blob of protoplasm! It's going to be a heavy day. Coincidence days always are."

"Enough damned talent around this zoo to manage without me for five more minutes—" But he rolled over and opened his eyes. "What degree of coincidence are we getting today, by the way?"

"You're the curator of this overgrown menagerie—you should know."

"You're the director of public relations—you get the figures out of the computer and dress 'em up pretty as bait for the be-lov-ed visitors." Nigel yawned.

Midge gave ground. After all, this, if anything, would haul her husband out of bed. "Ninety-nine and a half per cent," she said sweetly.

"*What?*" Nigel jolted upright. The bed complained frantically as it tried to find where he had got to and adjust to a suitable support-pattern. "But you can't have half a—"

"Day. Chlamys III's day-cycle overlaps and doesn't cut out until noon. So it's going to be a record-breaking morning."

"You win," Nigel sighed. He shouted at the shower to turn itself on warm. Midge overruled him.

"Cold!" she called. "*Ice*-cold!"

With a groan and a grim smile respectively, the Curator and the Public Relations Director of North America—Southeast—Extraterrestrial Zoo rose to face the alarming prospect of a Coincidence Day.

Chuckaluck roused from nostalgic dreams of paddling across the blyga fields by starlight, the aroma of crushed blossoms as vivid as reality in his olfactory cavities, and surveyed the accommodation where he was currently quartered. He was tightly inserted into a hollow redwood-tree stump—he liked the scent of the dried wood, and a little patient work on his arrival had turned the hole in the middle into a very passable substitute for his bed at home. Practically everything else within the four walls of his cell was from the same place as himself: Agassiz IV. Huge trailing clusters of bjao fruit dangled on the trellis masking the ceiling, dripping juice; frecatee leaves rustled to his left, nobmass stalks wove their ceaseless rhythms to his right. On Agassiz IV there was nowhere one could see bjao, frecatee and nobmass together—on the same continent, let alone the same patch of ground. But Chuckaluck wasn't complaining. He had settled in very well here, and his hosts—keepers—whatever one called them—were kindly and considerate.

He emerged from his sleeping-hole with a pop like a cork from a bottle. He was about the size of a large dog, covered with fine, close fur of a shade between russet and gold—a very attractive color, and one he often studied with approval in the mirror hidden behind the bjao trellis. He had three equally spaced lower limbs, affording him ambulation in any direction, and six upper limbs of great delicacy and sensitivity. The top of his body perceived color—in a range differing notably from the

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human—but shapes he detected chiefly by the use of a kind of sonar. His sense of smell was very highly evolved, thanks to the large wet cavities under his upper limbs, through three of which he breathed.

He retired first behind a clump of ubel, also an import from Agassiz IV, and performed morning excretions and acts of self-maintenance. Then he extended his lower limbs to their maximum length and began to browse a breakfast off the bjao vine.

Madam Senior-Jones emerged from her own similar morning ritual—ablutions, cosmetinting and certain other operations still more private but necessary before facing the world—and covered a yawn even though there was no one else in her luxurious apartment to be offended by a sight of her tonsils. The day stretched ahead of her, long, brilliant and empty. She yawned again as she dropped into her breakfast chair and instructed it to issue her Meal One, Day Nine of her current diet-chart.

Madam was her given name, not a title. Papa had been a stickler for the fitness of things. He had spent the greater part of a lifetime proving beyond reasonable doubt that his branch of the Jones family was the original one with which everyone else attempted to keep up; even after he adopted the hyphenated Senior in front of his name, however, other people resolutely refused to show him the deference due to a family tree of such eminence.

Fuming at the thought that his beloved daughter might have to go through life being treated like any ordinary person, he cast about for some means of insuring against this. Inspired by his own name—which was Adam, in honor of his most distant forefather—he hit on the ingenious device of giving her the name she now bore; it struck him as ideally appropriate, both because it rhymed with his own, and because it was a title so generally indicative of superiority that it had been used even when addressing queens.

On discovering, belatedly, the other main meaning of the word he could have died of mortification. But he had survived long enough to instill in the child a sense of the fitness of things nearly as intense as his own, and she had spent her entire leisured adult existence in setting right things which were none of her concern.

The tiring campaign to have the shelf-brackets in the left aisle-store of the city library coppered instead of chromed—more suitable to the genuine antique books in that wing, some of which had cloth and even leather bindings—had been successfully concluded two weeks before. She had recovered more quickly than she expected from this immense expenditure of effort, and had already mentioned to her most intimate friends her desire to get back into the swing of events soon. With much clucking of tongues and wondering how she ever found the energy, they then changed the subject.

Clearly, subjects for action were in short supply right now.

The chair delivered the meal recommended by the diet-chart—maximum energy, minimum calories—and also, to her surprise, an envelope bearing her address. She couldn't remember when she had last received a message other than via videophone; it was such a strain on most people to compose words into grammatical sentences with a writing machine, and so much more pleasant to sit for an hour or two chatting with a colored image before one to remind one to whom one was talking . . .

She turned the envelope over, puzzled, and it opened itself, dropping on her ample lap two enclosures. The first was brief to the point of curtness, and ran simply:

In view of the name you bear and the worthy opinions you hold on matters of public concern, I think you should see this and possibly take action!

There was no signature. But on studying the second enclosure, Madam Senior-Jones was quite prepared to forgive that. Why, even someone of her iron nerve would be shaken by the blatancy, the crudity, the savagery, the primitivism of it all!

Tears filled her eyes as she reflected how near this cause had been to dear Papa's heart, and how grossly she had dishonored his memory by letting the matter rest for so long. Why, it must be years since she gave a thought to the fate of our dumb cousins . . . !

Resolution filled her, to such unprecedented effect that within two hours she had not only spoken to eight of her old campaigning associates—those who had proved most indefatigable in the library affair and others similar—but also dressed in an outfit about which she did not immediately change her mind and take it off again.

She left her apartment and set off for NASEEZ, brandishing the offending second enclosure. It was a gaudy come-on pamphlet explaining about the record-breaking Coincidence Day.

NASEEZ was not a large zoo by Twenty-fifth Century standards—nothing like Outback Australia or Siberia-Mars. It could boast no more than two or three thousand alien exhibits, grouped in some fifty presentations. But it was the best-attended zoo on Earth, for two excellent reasons: it was nearer to large centers of population than any other EZ, and it had been able to select those exhibits which were most interesting to the casual sightseer. Outback and Siberia, the purpose of whose existence was to conduct research into the biology and metabolism of the alien creatures they housed, were hard to get to and rather dull if one did bother to make the trip. Free from this particular obligation, NASEEZ had been able to organize its material far more attractively.

True, it was necessary to separate exhibits and visitors by physical barriers. Many of the aliens breathed chlorine, some cyanide, and few could tolerate more than one percent oxygen. This disadvantage was felt keenly by people who had been accustomed since childhood to riding lion-back, wrestling crocodiles and braiding rattlesnake necklaces—the common attractions at old-fashioned

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Terrestrial Zoos—and who expected to be able to do corresponding things with alien beasts at NASEEZ. Of course, oxygen-breathing creatures could be allowed to enter the immediate presence of visitors; one such at present in residence was Chuckaluck, and very popular he had proved.

Few people, however, left NASEEZ disappointed, despite this drawback. A tour of the premises was made interesting by every possible device. Alien visual spectra, for instance, to one side or the other of the human range, allowed bizarre lighting effects, often brilliant ones, which the aliens did not perceive and hence were not bothered by.

Lighting for very exotic shadow shapes and hypnotic textures; fluctuation in the field strength of artificial gravities, giving a sensation of being on other planets; discreet aromas in the air-circulators; microphones to relay the curious noises made by cell occupants—all resources were called into play.

Of course, what visitors saw was only the surface of NASEEZ. A moment's reflection, or turning the pages of the souvenir guidebook, or the recorded explanatory voice emerging at every corner of every passageway, made that clear. Myriads of invisible mechanisms monitored the well-being of the creatures here. Atmosphere, temperature, gravity, food—this was only half the story. Some beings had digestive cycles dependent on temperature; some required special angles of illumination to prevent them developing anxiety neuroses; some could only excrete in response to special stimuli, lacking which they died rapidly of auto-intoxication. . . . This list of matters attended to by the tireless machines was well-nigh endless.

Directly connected with such questions was the zoo's worst problem.

Some state of minimal activity corresponding to sleep occurred in the biocycle of all the highly-organized creatures at NASEEZ. Visiting hours, naturally, had to be based on local—Earthside—time, but it was no help to anyone when those who came were confronted with a series of inert lumps, even if those lumps were fifty light-years from home.

Attempts were consequently always made to adapt the aliens to a twenty-four-hour day. Some adjusted easily; others could not at any price, being too tightly fixated on their home world's night-day cycle.

During the ten hours of a day when the zoo was open for visitors, as many as half the exhibits might be slumberously dull. Alternatively, the cycles might chime together and the whole place become a buzz of vigorous movement, color and sound. The latter occasions always brought visitors in hordes because they were always well advertised. For convenience they had to have a name and a definition: a Coincidence Day was one when forty or more of the fifty presentations were at day activity peak for at least five hours.

Today everything had hit at once. Even the fibrous creatures from Chlamys III would not re-pass the transition point between Ice IV and Ice V until after noon.

All records, and other things, were set to be broken.

"This is one busy day," Nigel muttered. For the past three hours he had been monitoring over the TV relays the ebb and flow of visitors along the tunnels, corridors and airy walkways of the zoo, like granulated blood-surrogate in some monster's circulatory system. He had also eavesdropped on the inane comments they were passing, and that was never an experience which endeared him to his own species.

"Admissions are at an all-time high," Midge confirmed. "I just read off the totals. But that's not what I wanted to tell you. Trouble's on the way."

"Said trouble being—?"

"The kind that runs in the Senior-Jones family. It has about seven or eight loyal associates at its heels."

Nigel winced, but rose to his feet. "I'll go tag along behind her party, then," he said. "Wish me luck."

"Speaking of luck," Midge said, taking his place at the TV monitors, "how's Chuckaluck today? Overexcited?"

"Not that it shows. More sort of—bored. Children *will* keep expecting to be given rides on him, and he's not adapted." Nigel pulled a face and went out.

"Disgraceful!" Madam Senior-Jones thundered, and her companions chimed in dutifully in agreement. "Inhuman! Savage!"

Curious eyes turned on her. She promised to be even more entertaining than the creatures on show from distant worlds.

"To imprison living beings whose birthright is freedom, like ours! Would you wish to be shut up and stared at?"

"Awful. Disgusting. Ought to be a law," confirmed the breathless ladies at her heels.

From a short distance to the rear, Nigel watched with narrowed eyes. Over the various cells, the never-ending auto-commentaries explained the nature of the exhibits.

". . . Accustomed to gravity of five decimal four Earth-normal, temperature minus seventy degrees Centigrade, atmosphere chiefly of hydrogen which is not utilized biologically, like the nitrogen in our own air, the active ingredient being . . ."

"To be taken—to be *ravished* from their familiar homes . . ." Madam howled on. "Thrust into this dark and noisome hole and made a geck and gull . . ."

Nigel didn't like having NASEEZ referred to as a noisome hole, but he did rather admire the Shakespearean quotation. He began mentally composing a limerick about Madam.

"Her father, a man most intense,
Literally spared no expense . . ."

Coming towards Chuckaluck's cell now, and the throng of people which always gathered there when he was out in the open, available for touching and—inevitably—

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smelling. He had a strong odor of his own, not unpleasant if you liked aniseed mixed with ambergris.

"To provide education
Befitting her station . . ."

The crowd, predominantly juvenile, had pulled back in awe around Chuckaluck: not from him, particularly, but from the man in spacecrew scarlet beside him. Some of the kids merely gazed admiringly, while others whispered among themselves and tried to work up the courage to ask for his thumbprint.

"And with nothing so common as sense!"

Nigel took a deep breath as Madam charged up to the man in scarlet and thrust a bony finger towards him.

"Are you one of the dastards who tear these miserable creatures from the bosom of their parent worlds and make them a spectacle for idle heartless thrill-seekers?"

One or two of her companions had doubts about the word "dastard," but only muttered to themselves. Madam was magnificently in command.

The spaceman looked her over and straightened from the low plinth on which he had been leaning. "Navigator Laban Howe, at your service," he said in a gentle drawl. "Would you mind repeating your question?"

"I said . . . Oh, you heard me perfectly well!" Madam had hit optimum pitch now, and was staying on it. "You've come to gloat over the fruits of your evil labor! Creating misery and casting into bondage creatures which, though they have not the fortune to be born on Earth, are at least living beings with rights and . . ."

Chuckaluck was yielding to excitement now, Nigel could tell by the way his upper limbs twitched, especially the ones under which were his three breathing orifices.

Navigator Howe caught the attention of the amused crowd gathered behind Madam, and gave them an enormous sidelong wink which provoked anticipatory grins. "Matter of fact," he stated in a casual tone, "I came to say hello to Chuckaluck here, see how he's getting along. He tells me he's fine."

"He . . . *tells* you?" echoed Madam, almost choking with passion.

"Why, sure!" The voice full of innocence, but another big wink in case the audience missed the point the first time. "I visited Agassiz a couple of times, and Chuckaluck and me, we understand each other pretty well."

"*Shame*!" screamed Madam as soon as she could take a breath deep enough to match the depth of her feelings. "To exhibit brute beasts and pander to the sensation-seeking no-goods of our decadent modern age—that's bad enough. But to place a creature here to whom has been accorded the divine gift of speech . . . !" She raised both fists. "Who's in charge of this monstrous disgusting inhuman prison?"

Nigel sighed and pushed his way through her train of clucking biddies. "I am the Curator of this zoo," he said in a firm voice, "and I must require you to leave the precincts at once. You are causing a disturbance and interfering with the peaceful enjoyment of other visitors."

For two and a half minutes she told him what she thought of this kind of enjoyment. When she paused, he said, as though there had been no interruption, "Or else I shall send for the police and have you physically removed from the zoo."

Two hours later the police came—for him and Chuckaluck. While they were waiting, Midge had performed some speculative calculations, addressing the air rather than Nigel.

"Well, it'll take her one hour to finish expressing her opinion of Nigel Stonerley, the infamous tyrant and public enemy, and another hour to work out the constructive paths of action. Her first impulse will be to video her Pan-Solar Congressman . . ."

"I hope to goodness she doesn't," muttered Nigel. "Egremont Sissoko is the last person I'd want here right now."

"Should have thought of that earlier. Well, maybe she skipped that and went straight to Stage Two: contact the local news services. Stage Three will be to find the Mayor and Chief of Police and lay a complaint against you. Two hours."

Correct: and the police, in a puzzled frame of mind, but armed with a John Doe warrant and a list of possible charges including kidnaping, unlawful detention and slander. (The last was a gallant shot in the dark by one of Madam's colleagues, widow of a lawyer whom she had worked into an early grave, and who did her best to cope with Madam's fits of annoyance when she felt "there oughta be" but wasn't "a law".)

"Is this thing O.K. the way he is?" the sergeant of police inquired, eying Chuckaluck's gold and russet form with some diffidence. "Oughtn't he to be on a lead or something?"

"Chuckaluck has never been involved in any trouble since he came here," Midge snapped. "And if it wasn't for that silly woman he wouldn't be involved in any now."

"I guess not," the sergeant sighed, and moved towards the window at which the squad floater waited.

News today must be scanty, Nigel realized. Several news chains had had the bright idea of picking up this oddball story and giving it silly-season prominence, and headlines blared at them as they approached the courtroom through a horde of camereyes, mikears and extensosensors.

WHO'S ZOO? IT'S A GAS SAYS AGASSIZ! SERIOUS CHARGE AGST CURATOR, NASEEZ.

And so on.

Waiting in the court, looking righteous, were Madam and her group of instant campaigners. Someone either on her list of contacts or else—more likely—on the court's advisory staff had done some quick research, because when Judge Corcoran entered to take his place on the bench he proved not to be sitting alone, but with two assessors, the standard precedure to determine whether a

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bill would lie. The one on his right was human: a provincial senator from NAPROV Congressenate. The one on his left was a featureless metal cylinder with extensosensors angled up from its top.

The public seating was crammed; videoceptors or other news-gathering devices filled every pew. The air was taut as overstrained elastic.

"Right!" said the judge, when everyone had stared his or her fill of Chuckaluck, seated after the fashion of his species on the most suitable article the premises could offer, a large wastebin. "I'm Judge Corcoran, sitting with assessors here to determine whether an offense has been committed against the general tenor and spirit of Solar System justice, there being no specific statute . . ."

"Yes there is!" Madam interrupted. "I sent you three . . ."

"Silence," the judge said. "Yes, you sent me three, and I've incorporated them in the hypothetical indictment . . ."

"There's nothing hypothetical about what's been done to this poor creature," Madam said firmly, and clamped her mouth shut.

"Er. Yes." Judge Corcoran studied Chuckaluck briefly and gave a shrug. "As to identities of parties to the action: you're Nigel Stonerley, correct? Curator of NASEEZ? Hm-m-m. Well, you're indicted conjointly with those who have aided and abetted the bringing from Agassiz IV of the creature known as Chuckaluck, especially Navigator Laban Howe of the Interstellar Service. Uh . . . as to Chuckaluck: *is* that his name?"

"It's as near as most people can come to pronouncing it."

"I see. And can he understand these proceedings?"

"Oh, sure he can." Nigel blinked. "What he can't understand, he says, is the point of them."

"Shame on you!" Madam bellowed across the court. "Putting lies into the mouth of a brute beast to . . ."

She broke off, eyes widening, just as Corcoran banged his gavel and ordered her to be silent.

"You shouldn't be so hard on the lady," admonished the human assessor, the Provincial Senator. He was dimly aware that organizing women like Madam were a power in the land hereabouts, and had some notion that she might put votes his way at the next election.

"Thank you!" Madam acknowledged. "It's a pleasure to know someone present enjoys natural human tenderness and compassion."

The robot assessor signaled for attention and said in its grating voice, "Precedent shows that emotion clouds the true evaluation of facts. Judge is directed to note that my assessment is not confused by bias or compassion."

Looking harassed, Corcoran said, "Yes . . . ah . . . thank you. Well now, as I was saying earlier: no statute is clearly applicable but the law recognizes that we live in an evolving universe and permits the device of a hypothetical indictment to see if an action is contrary to the tenor of natural justice and . . ."

"You have just heard him admit it," Madam broke in.

"Ah . . . what?" Corcoran was wishing the case had fallen to anyone but himself, by now.

"He admitted it, when he said Chuckaluck understands what's going on!" Madam leaned forward intensely. "He's kept a speech-gifted being in miserable captivity, in *durance vile* in his abominable zoo—which ought to be closed down anyway, ought never to have been opened and wouldn't have been if my lamented Papa had had his way—disgusting to pen living creatures into cages and cells and let the common ruck and run go gawk and gape at . . ."

"What . . . is . . . this . . . farce?" said a measured voice from the doorway of the courtroom

All heads turned. A thick-set man stood there, scowling, his polished bald head reflecting the lights in the ceiling. There was no mistaking the celebrated NASE delegate to the Pan-Solar Congress, Egremont Sissoko.

"Why, Congressman!" Madam exclaimed delightedly. "How good, how kind of you to answer my call so promptly! How . . ."

"Shut up, you silly woman," Sissoko said, and the words left her gasping for air, exactly like a gaffed fish, mouth working and no sound emerging. "Well, Nigel?" he added to the Curator of NASEEZ. "I suppose you chose this particular day because I was away from the Capitol, and it never struck you that I might be coming to look over my bailiwick rather than taking a vacation!"

Nigel, looking almost as miserable as Madam, shook his head. "It's Coincidence Day, that's all. It's purely a coincidence that . . ."

"Coincidences hell," Sissoko said briskly. "All right, Judge, clear the court and I'll explain. Or . . . damnation, why should I bother clearing the court? It's only going to kick up rumors."

"Thank you," Corcoran said with some dignity. "This is after all *my* court, and telling me to clear it is close to contempt."

"Oh, the contempt has been on someone else's part," Sissoko snorted. He strode up to the bench and whispered, too low for the news services to pick up; even the robot assessor had to crane close with its extensosensors.

Then it said loudly, "Information confirms tentative opinion. Gross infringement of privilege. Recommend arrest of Madam Senior-Jones and associates as public nuisances and disturbers of the peace . . ."

It took the judge that long to shut off its speech circuits. The shock was too much for Madam; she keeled over in a dead faint.

"That's carrying things a bit far," Sissoko grunted. "I guess we can leave it at that. O.K., boys and girls?" he added to the news service. "Break it up. All finished. If you haven't figured it out yet, go look up Senior-Jones in the Record of Digest Biography and read about his campaign to prevent NASEEZ being built."

It might occur to them to wonder about the robot's choice of the phrase "gross infringement of privilege"—

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but so long as they didn't hit on the right explanation for that, things were all in order.

"I'm terribly sorry, Chuckaluck," Nigel said in halting Agassizian as they re-entered the office from which he kept watch on the zoo. "It's going to spoil your thesis, isn't it, having the campaign cut short in this way?"

Chuckaluck laid a comforting upper limb on Nigel's shoulder and uttered a wheeing reply, meaning approximately, "Never mind. Even from this brief experience I have garnered clues to many things which mystified me beforehand."

Nigel, wondering whether this was kindliness or the truth, gave a grateful smile nonetheless and looked around the room. His smile vanished. Instead of finding only Midge, he was confronted with a thunderous-looking Sissoko.

"Now you two have some explaining to do," Sissoko barked. "Come on, out with it! What's the real story? I told the judge it was part of the Senior-Jones campaign against NASEEZ and motivation by malice would be proved easily—you were just stringing along to get the publicity, which was disgraceful."

"No, I promise you it was done with the best intentions," Chuckaluck wheed. Nigel translated, and looked earnestly at Sissoko.

"Congressman, Chuckaluck has been doing a study, ever since his arrival, of campaigns in human society—how grievances and complaints get taken up by organized bodies of people and how the process is brought to a conclusion in or not in the form of action. Well, of course, he's had plenty of secondhand information, but he's never been directly involved in such a campaign.

"It . . . uh . . . worried Midge and me, because after all it's Agassiz IV where we're going to serve our time as zoo specimens, and we wanted to do as much as possible for him. Then we hit on a solution by a luck coincidence."

"I'm hearing too damned much about coincidences!" growled Sissoko.

"Well, this *was* one." Midge turned defiant eyes on him. "A Coincidence Day here meant that we were distributing a lot of publicity anyway, and we heard that the most vocal local . . . I mean . . . oh, the *hell:* vocal local is what she is . . . professional-amateur campaign-forcer was at a loose end. It involved nothing more on our part than sending her a copy of our pamphlet and an unsigned letter urging action. We were sure an oblique reference to her family name would trigger the response we wanted."

"We happened . . . uh . . . yes, we just *happened* to have heard from Laban Howe to say he wanted to call on Chuckaluck before lifting for space again." Nigel combed his hair with nervous fingers. "So we persuaded him to meet the Madam if it could be arranged—which it could—and he played his part to perfection."

"Blazes, don't sound so smug!" Sissoko blasted them. "You took the most damnable risks! What do you think would have happened if it had come out in open court that you, so-called Curator of NASEEZ, have no more power over the place than I have—that it's a co-operative run by its inhabitants and the staff jobs are given to volunteers bound for zoos on other planets? Hey?"

"It wouldn't have come out," Nigel muttered. "I'd arranged for—"

"What *you'd* arranged had resulted in the concentrated attention of every news service in the province," Sissoko cut in. "I wish we didn't have to run a zoo anyway! It's a thin cover at best."

"But very useful," wheed Chuckaluck. "One could hardly expect humans to act naturally in the presence of spacesuited visitors, if we were to go among you to conduct our studies of your species. Thinking themselves only in the presence of their own kind and unintelligent—hence uncritical—animals, they relax and act unaffectedly."

"Granted," Sissoko agreed when Nigel translated. "But . . . all right, you tell me then. What were you going to do which would have prevented the truth from emerging and wrecking a century of hard work?" He mopped his face. "I can just imagine that stupid Provincial Senator sitting up, all self-important, and shooting off his mouth about deceit and trickery and dishonest dealings and anyway humans shouldn't be exposed to such scrutiny. Young man are you trying to tell me you have *volunteered* to demean your dignity as a human being by offering to go and be a-a-a-!"

His parody of helpless astonishment and righteous indignation was so effective even he found he was grinning at the end of it.

"As it so happens," Midge chuckled, "I have right here an example of what we were going to do to prevent such ideas getting about." She tapped open a drawer and handed a sheet of gaudy paper to Sissoko.

It looked like, but wasn't, a photo. It was an offset threedee drawing in full color of an easily recognizable spot within NASEEZ, but shown from within the exhibits' cells. Beyond the barriers shutting off the cells, but fully visible, were people, and all of them had a subtle but noticeable resemblance to Madam Senior-Jones.

"That's the pamphlet for our next Coincidence Day," Midge explained. "Or will be, when text is added. You'll notice that the illusion is given of looking into the public areas from the cells, of the roles being reversed—does it affect you? We spent a long time getting it right!"

"Oh, yes." Sissoko was chortling. "Perfect, perfect! Show people the truth the right way, and they'll never believe it. Right here is the way things are—aliens studying people in the zoo—and not one person who sees this will think of anything but that Madam made a fool of her species by saying they were penning up an intelligent being." He tossed the picture on the table.

"O.K., you're forgiven. But I hope the next Curator has fewer bright ideas. The sooner you're safely shut up in a zoo on Agassiz IV, the better I'll be pleased." ■

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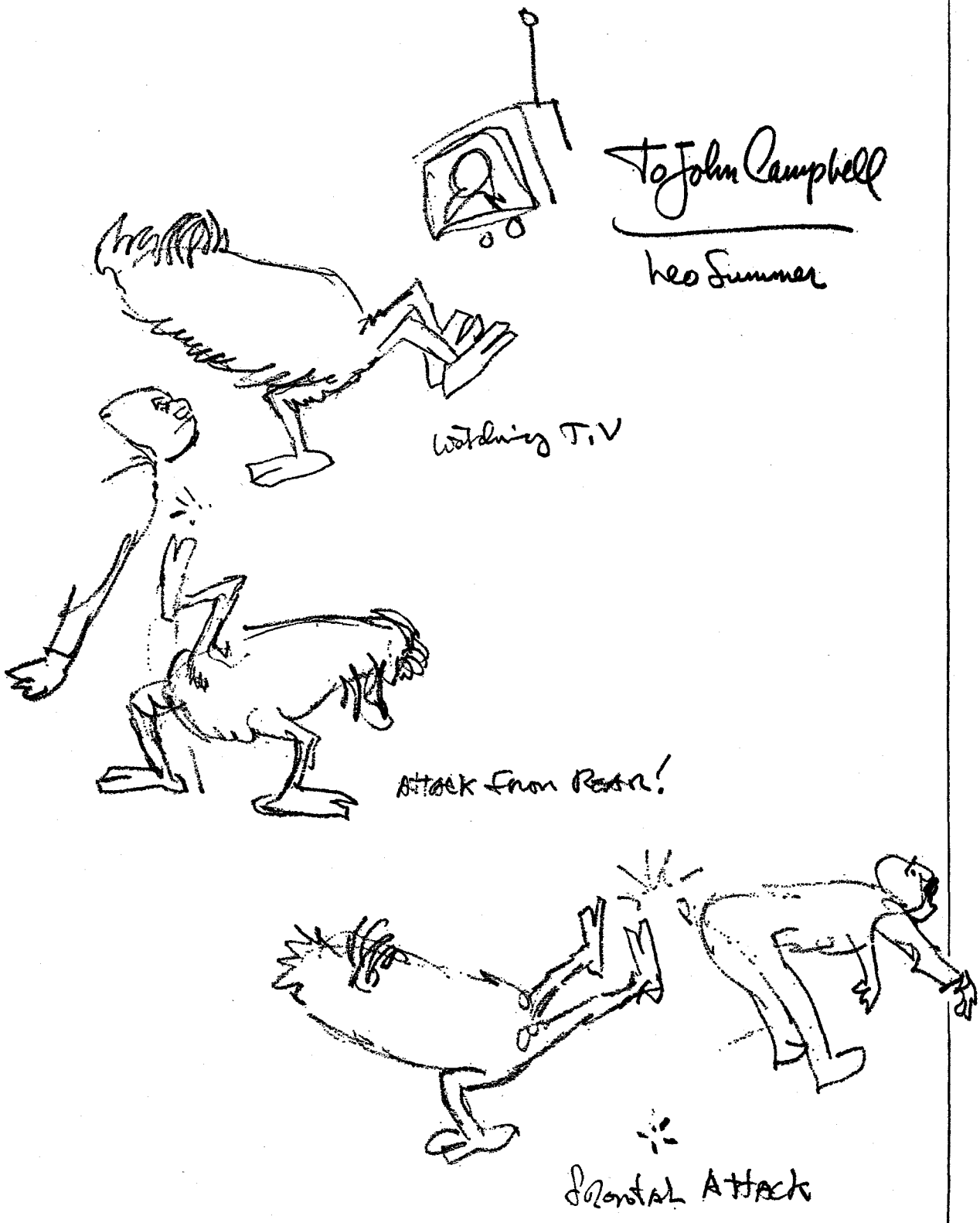

Sometimes the Editor and the Artist have some disagreement as to the practicability of a particular anatomical design for an Alien. Of course, an Editor is necessarily good at word-slinging . . . but an artist has his way of arguing, too . . .

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Illustrated by John Schoenherr

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Part Two of Five Parts.
Muad'Dib could see a thousand ways to become the Prophet Leader of a great Holy War, burning across the galaxy, heading victorious legions. That was easy. Without his strange, erratic, uncontrollable sense of the future, it was inescapable . . .

THE PROPHET OF DUNE | FRANK HERBERT

SYNOPSIS

Duke Leto Atreides is dead, murdered by the gross and cunning old Baron Vladimir Harkonnen. Leto's son, Paul, now a duke at the age of fifteen, is a fugitive with his mother, the Lady Jessica, on the surface of Arrakis, the deadly desert planet known as Dune.

A price of ten billion solaris has been placed on Paul's head by the Baron, who captured Arrakis with the secret aid of Imperial Sardaukar. These ruthless troops of the Padishah Emperor Shaddam IV now have loosed a pogrom on Arrakis to exterminate the native Fremen, and it is with the Fremen that Paul seeks sanctuary.

The golden prize of Arrakis, the planet's one-crop melange *spice which prolongs life and cannot be obtained anywhere else in the known universe, is once again in the hands of the Baron and his CHOAM Company confederates. Atreides troops are scattered or dead, and the only resources Paul can spend include:*

THE LADY JESSICA, Leto's concubine and Paul's mother. She is a Bene Gesserit, graduate of the deep mystery, trained in the all-woman schools of the Great Mother cult. But Jessica is pregnant with the daughter the Bene Gesserits told her to bear and she has the beginnings of doubts about those who trained her. (Among her teachers was the Reverend Mother Gaius Helen Mohiam, the Emperor's own Truthsayer.)

DUNCAN IDAHO, Leto's swordmaster. Duncan is now dead, killed buying Paul and Jessica the time to escape a Harkonnen trap. Before his death, Idaho sprang his own trap on the attackers, luring them to fire lasguns against a force shield. The resultant blast killed the attackers and made the surviving Harkonnen-Sardaukar forces more cautious with lasbeams.

LIET-KYNES, Imperial Planetologist on Arrakis, who has gone native on the planet and assumed a quasi-religious role with the wild Fremen hordes. Kynes helped in

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the escape of Paul and Jessica, providing stillsuits and other specialized equipment for them to survive in a land dominated by arid heat, giant worms that "swim" in the sand, and coriolis storms that reach sandblast forces of seven hundred to eight hundred kilometers an hour.

GURNEY HALLECK, Leto's minstrel-warrior, who has fled with a handful of troops to sanctuary under the spice smuggler Staban Tuek. Gurney believes Paul and the Lady Jessica dead—and that it was Jessica who betrayed her Duke to the Harkonnens.

THUFIR HAWAT, the mentat *master of assassins, a man trained to use his mind like a superb computer. But Thufir also believes Jessica was the traitor, and now he is a captive of the Sardaukar-Harkonnen force. He has been fed a residual poison by the Baron and is being kept alive by periodic administration of the antidote.*

In the background of Paul's trial is his half-awakened prescience, a power heightened by the addictive spice, which is a poison when taken too freely. Yet Paul knows through prescient vision that the spice diet can turn his eyes the total blue of the ibad *and raise him to religious authority among the Fremen. He is torn by glimpses of a future in which he becomes that male force the Bene Gesserits have sought for centuries—the* Kwisatz Haderach, *an instrument of Race Consciousness and Terrible Purpose. He sees in that weight of infinite futures a bloody religious crusade, a wild* jihad *waged in his name—and he is torn by revulsion at the very thought of it.*

Now, while the Baron firms his grip on Arrakis, making plans to put his nephew, Beast Rabban, in absolute power there, and with the favorite nephew, Feyd-Rautha, held in reserve for subtle purposes . . . Paul and his mother flee southward into the killer desert. They are crossing a reach of sand where lurks a giant worm and they have heard the worm come to a thumper *lure they planted in the rocks to occupy it while they try to escape.*

Part 2

"Keep moving," Paul whispered. "Don't look back."

A grating sound of fury exploded from the rock shadows they had left. It was a flailing avalanche of noise

"Keep moving," Paul repeated.

He saw that they had reached an unmarked point where the two rock faces—the one ahead and the one behind—appeared equally remote.

And still behind them, that whipping, frenzied tearing of rocks dominated the night.

They moved on and on and on . . . Muscles reached a stage of mechanical aching that seemed to stretch out indefinitely, but Paul saw that the beckoning escarpment ahead of them had climbed higher.

Jessica moved in a void of concentration, aware that the pressure of her will alone kept her walking. Dryness ached in her mouth, but the sounds behind meant no stopping for a sip from her stillsuit's catch-pockets.

"Lump . . . lump . . ."

Renewed frenzy erupted from the distant cliff, drowning out the thumper.

Silence!

"Faster," Paul whispered.

She nodded, knowing he did not see the gesture, but needing the action to tell herself that it was necessary to demand even more from muscles that already were being taxed to their limits—the unnatural movement . . .

The rock face of safety ahead of them climbed into the stars, and Paul saw a plane of flat sand stretching out at the base. He stepped onto it, stumbled in his fatigue, righted himself with an involuntary outthrusting of a foot.

Resonant booming shook the sand around them.

Paul lurched sideways two steps.

"Boom! Boom!"

"Drum sand!" Jessica hissed.

Paul recovered his balance. A sweeping glance took in the sand around them, the rock escarpment perhaps two hundred meters away.

Behind them, he heard a hissing—like the wind, like a riptide where there was no water.

"Run!" Jessica screamed. "Paul, run!"

They ran.

Drumsound boomed beneath their feet. Then they were out of it and into pea gravel. For a time, the running was a relief to muscles that ached from unfamiliar, rhythmless use. Here was action that could be understood. Here was rhythm. But sand and gravel dragged at their feet. And the hissing approach of the worm was storm sound that grew around them.

Jessica stumbled to her knees. All she could think of was the fatigue and the sound and the terror.

Paul dragged her up.

They ran on, hand in hand.

A thin pole jutted from the sand ahead of them. They passed it, saw another.

Jessica's mind failed to register on the poles until they were past.

There was another—wind-etched surface thrust up from a crack in rock.

Another.

Rock!

She felt it through her feet, the shock of unresisting surface, gained new strength from the firmer footing.

A deep crack stretched its vertical shadow upward into the cliff ahead of them. They sprinted for it, crowded into the narrow hole.

Behind them, the sound of the worm's passage stopped.

Jessica and Paul turned, peered out onto the desert.

Where the dunes began, perhaps fifty meters away at the foot of a rock beach, a silver-gray curve broached from the dunes, sending rivers of sand and dust cascading all around. It lifted higher, resolved into a giant, questing mouth. It was a round black hole with edges glistening in the moonlight.

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The mouth snaked toward the narrow crack where Paul and Jessica huddled. Cinnamon yelled in their nostrils. Moonlight flashed from crystal teeth.

Back and forth the great mouth weaved.

Paul stilled his breathing.

Jessica crouched, staring.

It took intense concentration of all her Bene Gesserit training to put down the primal terrors, to subdue a race-memory fear that threatened to overwhelm her mind.

Behind his fear, Paul sensed a strange elation. In some recent instant he had crossed another Time barrier into the unknown. Prescient darkness lay all around him as though he had been disconnected from the inner eye or plunged into a trough where the standing wave of the Future could not be seen.

He understood the elation then. Time-darkness forced a hyper-acceleration of his other senses, forced him to rely on the shadow experiences of the uncounted lives he had lived in the possible futures.

Now, he registered every aspect of the thing that lifted from the sand. Its mouth spread some eighty meters. Crystal teeth with the curved shape of crysknives glistened around that dark rim. There came the bellows breath of cinnamon, of subtle aldehydes . . . acids . . .

The worm blotted out the moonlight as it brushed the rocks above them. A shower of small stones and sand cascaded into their narrow hiding place.

Paul crowded his mother farther back.

Cinnamon!

The smell of it flooded across them.

What has the worm to do with the melange spice? Paul asked himself.

Baarrrrroooom!

It was a peal of dry thunder from far off to their right.

Again: *Baarrrrroooom!*

The worm drew back onto the sand, lay there momentarily, its crystal teeth weaving moonflashes.

"Lump! Lump! Lump! Lump!"

Another thumper! Paul thought.

Again, it sounded off to their right.

A shudder passed through the worm. It drew farther away into the sand. Only a mounded upper curve remained like half a bell mouth, the curve of a tunnel rearing above the dunes.

Sand rasped.

The creature sank farther, retreating, turning. It became a mound of cresting sand that curved away through a saddle in the dunes.

Paul stepped out of the crack, watched the sandwave recede across the waste toward the new thumper summons.

Jessica followed, listening: "Lump-lump-lump-lump . . ."

Presently, the sound stopped.

Paul found the tube into his stillsuit, sipped at the reclaimed water.

Jessica focused on his action, but her mind felt blank with fatigue and the aftermath of terror. "Has it gone for sure?" she whispered.

"Somebody called it," Paul said. "Fremen."

She felt herself recovering. "It was so big!"

"Not as big as the one that got our 'thopter."

"Are you sure it was Fremen?"

"They used a thumper."

"Why would they help us?"

"Maybe they weren't helping us. Maybe they were just calling a worm."

"Why?"

An answer lay poised at the edge of his awareness, but refused to come. He had a vision in his mind of something to do with the telescoping barbed sticks in their pack—the "Maker Hooks."

"Why would they call a worm?" Jessica asked.

A breath of fear touched his mind, and he forced himself to turn away from his mother, to look up the cliff.

"We'd better find a way up there before daylight." He pointed. "Those poles we passed—there are more of them."

She looked, following the line of his hand, saw the poles—wind-scratched markers—made out the shadow of a narrow ledge that twisted into a crevasse high above them."

"They mark a way up the cliff," Paul said. He settled his shoulders into the pack, crossed to the foot of the ledge and began the climb upward.

Jessica waited a moment, resting, restoring her strength; then followed.

Up-up they climbed, following the guide poles until the ledge dwindled to a narrow lip at the mouth of a dark crevasse.

Paul tipped his head to peer into the shadowed place. He could feel the precarious hold his feet had on the slender ledge, but forced himself to slow caution. He saw only darkness within the crevasse. It stretched away upward, open to the stars at the top. His ears searched, found only sounds he could expect—a tiny spill of sand, an insect *brrr*, the patter of a small running creature. He tested the darkness in the crevasse with one foot, found rock beneath a gritting surface. Slowly, he inched around the corner, signaled for his mother to follow. He grasped a loose edge of her robe, helped her around.

They looked upward at starlight framed by two rock lips. Paul saw his mother beside him as a cloudy gray movement. "If we could only risk a light," he whispered.

"We have other senses than eyes," she said.

Paul slid a foot forward, shifted his weight and probed with the other foot, met an obstruction. He lifted his foot, found a step, pulled himself up onto it. He reached back, felt his mother's arm, tugged at her robe for her to follow.

Another step.

"It goes on up to the top, I think," he whispered.

Shallow and even steps, Jessica thought. *Mancarved beyond a doubt.*

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She followed the shadowy movement of Paul's progress, feeling out the steps. Rock walls narrowed until her shoulders almost brushed them. The steps ended in a slitted defile about twenty meters long, its floor level, and this opened onto a shallow, moonlit basin.

Paul stepped out into the rim of the basin, whispered: "What a beautiful place."

Jessica could only stare in silent agreement from her position a step behind him.

In spite of weariness, the irritation of recaths and nose plugs and the confinement of the stillsuit, in spite of fear and the aching desire for rest—this basin's beauty filled her senses, forcing her to stop and admire it.

"Like a fairyland," Paul whispered.

Jessica nodded.

Spreading away in front of her stretched desert growth —bushes, cacti, tiny clumps of leaves—all trembling in the moonlight. The ringwalls were dark to her left, moonfrosted on her right.

"This must be a Fremen place," Paul said.

"There would have to be people for this many plants to survive," she agreed. She uncapped the tube to her stillsuit's catchpockets, sipped at it. Warm, faintly acrid wetness slipped down her throat. She marked how it refreshed her. The tube's cap grated against flakes of sand as she replaced it.

Movement caught Paul's attention—to his right and down on the basin floor curving out beneath them. He stared down through smoke bushes and weeds into a wedged slab sand-surface of moonlight inhabited by an *up-hop, jump, pop-hop* of tiny motion.

"Mice!" he hissed.

Pop-hop-hop! they went, into shadows and out.

Something fell soundlessly past their eyes into the mice. There came a thin screech, a flapping of wings and a ghostly gray bird lifted away across the basin with a small dark shadow in its talons.

We needed that reminder, Jessica thought.

Paul continued to stare across the basin. He inhaled, sensed the softly cutting contralto smell of sage climbing the night. The predatory bird—he thought of it as the way of this desert. It had brought a stillness to the basin so unuttered that the blue-milk moonlight could amost be heard flowing across sentinel saguaro and spiked paintbush. There was a low humming of light here more basic in its harmony than any other music in his universe.

"We'd better find a place to pitch the tent," he said casually.

"To morrow we can try to find the Fremen who . . ."

"Most intruders here regret finding the Fremen!"

It was a heavy masculine voice chopping across his words, shattering the moment. The voice came from above them and to their right.

"Please do not run, intruders," the voice said as Paul made to withdraw into the defile. "If you run, you'll only waste your body's water."

They want us for the water of our flesh! Jessica thought

Her muscles overrode all fatigue, flowed into that maximum readiness which did not betray itself. She pinpointed the voice, thinking: *Such stealth! I didn't detect him.* And she realized the owner of that voice had made only the small sounds, the natural sounds of the desert.

Another voice called from the basin rim to the left. "Make it quick, Stil. Get their water and let's be on our way. We've little enough time before dawn."

Paul, his body less conditioned to emergency response, felt chagrin that he had stiffened and tried to withdraw, that he had clouded his abilities by momentary panic. Now, he forced himself to obey his mother's teachings: relax, then fall into the semblance of relaxation, then into the arrested whipsnap of muscles that could slash in any direction.

Still, he felt the edge of fear and knew its source. This was *blind-Time,* a place and series of point-events not linked by prescient vision. He stood within an ultimate emergency, forced to rely on his training and on the experience lines of possible futures as yet only poorly absorbed into his young body. He felt that he was not really ready, yet he and his mother were caught by wild Fremen whose only interest lay in the water carried by the flesh of two unshielded bodies.

He had to be ready!

VIII

This Fremen religious adaptation, then, is the source of what we now recognize as "The Pillars of The Universe," whose Oizara Tafwid are among us all with signs and proofs and prophecy. They bring us the Arrakeen mystical fusion whose profound beauty is typified by the stirring music built on the old forms, but stamped with the new awakening. Who has not heard and been deeply moved by "The Old Man's Hymn?"

I drove my feet through a desert
Whose mirage fluttered like a host.
Voracious for glory, greedy for danger,
I roamed the horizons of al-Kulab,
Watching Time level mountains
In its search and its hunger for me.
And I saw the sparrows swiftly approach,
Bolder than the onrushing wolf.
They spread in the tree of my youth.
I heard the flock in my branches
And was caught on their beaks and claws!

"Arrakis Awakening"
by the Princess Irulan

The man crawled across a dunetop. He was a mote caught in the glare of the noon sun. He wore only torn remnants of a jubba cloak, his skin bare to the heat through the tatters. The hood had been ripped from the cloak, but the man had fashioned a turban from a torn strip of cloth. Wisps of sandy hair protruded from it, matched by a sparse beard and thick brows. Beneath the

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blue-within-blue eyes, remains of a dark stain spread down to his cheeks. A matted depression across mustache and beard showed where a stillsuit tube had marked out its path from nose to catchpockets.

The man stopped half across the dunecrest, arms stretched down the slipface. Blood had clotted on his back and on his arms and legs. Patches of yellow-gray sand clung to the wounds. Slowly, he brought his hands under him, pushed himself to his feet, stood there swaying. And even in this almost-random action there remained a trace of once precise movement.

"I am Liet-Kynes," he said, addressing himself to the empty horizon, and his voice was a hoarse caricature of the strength it had known. "I am his Imperial Majesty's Planetologist," he whispered, "planetary ecologist for Arrakis. I am steward of this land."

He stumbled, fell sideways along the crusty surface of the windward face. His hands dug feebly into the sand.

I am steward of this sand, he thought.

He realized that he was semi-delirious, that he should dig himself into the sand, find the relatively cool under layer and cover himself with it. But he still could smell the rank, semisweet esters of a pre-spice pocket somewhere underneath this sand. He knew the peril within this fact more certainly than any other Fremen. If he could smell the pre-spice mass, that meant the gases deep under the sand were nearing explosive pressure. He had to get away from here.

His hands made weak scrabbling motions along the dune face.

A thought spread across his mind—clear, distinct: *The real wealth of a planet is in its landscape, how we take part in that basic source of civilization—agriculture.*

And he thought how strange it was that the mind, long fixed on a single track, could not get off that track. The Harkonnen troopers had left him here without water or stillsuit, thinking a worm would get him if the desert didn't. They had thought it amusing to leave him alive to die by inches at the impersonal hands of his planet.

The Harkonnens always did find it difficult to kill Fremen, he thought. *We don't die easily. I should be dead now . . . I will be dead soon . . . but I can't stop being an ecologist.*

"The highest function of ecology is understanding consequences."

The voice shocked him because he recognized it and knew the owner of it was dead. It was the voice of his father who had been Planetologist here before him—his father long dead, killed in the cave-in at Plaster Basin.

"Got yourself into quite a fix here, son," his father said. "You should've known the consequences of trying to help the child of that Duke."

I'm delirious, Kynes thought.

The voice seemed to come from his right. Kynes scraped his face through sand, turning to look in that direction—nothing except a curving stretch of dune dancing with the heat devils in the full glare of the sun.

"The more life there is within a system, the more niches there are for life," his father said. And the voice came now from his left, from behind him.

Why does he keep moving around? Kynes asked himself. *Doesn't he want me to see him?*

"Life improves the capacity of the environment to sustain life," his father said. "Life makes needed nutrients more readily available. It binds more energy into the system through the tremendous chemical interplay from organism to organism."

Why does he keep harping on the same subject? Kynes asked himself. *I knew that before I was ten.*

Desert hawks, carrion eaters in this land, as were most wild creatures, began to circle over him. Kynes saw a shadow pass near his hand, forced his head farther around to look upward. The birds were a blurred patch on silver-blue sky—distant flecks of soot floating above him.

"We are generalists," his father said. "You can't draw neat lines around planet-wide problems. Planetology is a cut and fit science."

What's he trying to tell me? Kynes wondered. *Is there some consequence I failed to see?*

His cheek slumped back against the hot sand, and he smelled the burned rock odor beneath the pre-spice gases. From some corner of logic in his mind, a thought formed: *Those are carrion-eater birds over me. Perhaps some of my Fremen will see them and come to investigate.*

"To the working planetologist, his most important tool is human beings," his father said. "You must cultivate ecological literacy among the people. That's why I've created this entirely new form of ecological notation."

He's repeating things he said to me when I was a child, Kynes thought.

He began to feel cool, but that corner of logic in his mind told him: *The sun is overhead. You have no stillsuit and you're hot; the sun is burning the moisture out of your body.*

His fingers clawed feebly at the sand.

They couldn't even leave me a stillsuit!

"The presence of moisture in the air helps prevent too rapid evaporation from living bodies," his father said.

Why does he keep repeating the obvious? Kynes wondered.

He tried to think of moisture in the air—grass covering this dune . . . open water somewhere beneath him, a long *ganat* flowing with water across the desert, and trees lining it . . . He had never seen water open to the sky except in text illustrations. Open water . . . irrigation water . . . it took five thousand cubic meters of water to irrigate one hectare of land, he remembered.

"Our first goal on Arrakis," his father said, "is grassland provinces. We will start with these mutated poverty grasses. When we have moisture locked in grasslands, we'll move on to start upland forests, then a few open bodies of water—small at first—and situated along lines

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of prevailing winds with windtrap moisture precipitators spaced in the lines to recapture what the wind steals. We must create a true sirocco—a moist wind, but we will never get away from the necessity for windtraps."

Always lecturing me, Kynes thought. *Why doesn't he shut up? Can't he see I'm dying?*

"You will die, too," his father said, "if you don't get off the bubble that's forming right now deep underneath you. It's there and you know it. You can smell the pre-spice gases. You know the Little Makers are beginning to lose some of their water into the mass."

The thought of that water beneath him was maddening. He imagined it now—sealed off in strata of porous rock by the leathery half-plant half-animal Little Makers—and the thin rupture that was pouring a cool stream of clearest pure liquid soothing water into . . .

A pre-spice mass!

He inhaled, smelling the rank sweetness. The odor was much richer around him than it had been.

Kynes pushed himself to his knees, heard a bird screech, the hurried flapping of wings.

This is spice desert, he thought. *There must be Fremen about even in the day sun. Surely, they can see the birds and will investigate.*

"Movement across the landscape is a necessity for animal life," his father said. "Nomad peoples follow the same necessity. Lines of movement adjust to physical needs for water, food, minerals. We must control this movement now, align it for our purposes."

"Shut up, old man," Kynes muttered.

"We must do a thing on Arrakis never before attempted for an entire planet," his father said. "We must use man as a constructive ecological force—inserting adapted terraform life: a plant here, an animal there, a man in that place—to transform the water cycle, to build a new kind of landscape."

"Shut up!" Kynes croaked.

"It was lines of movement that gave us the first clue to the relationship between worms and spice," his father said.

A worm, Kynes thought with a surge of hope. *A Maker's sure to come when this bubble bursts. But I have no hooks. How can I mount a Big Maker without hooks?*

He could feel frustration sapping what little strength remained to him. Water so near—only a hundred meters or so beneath him; a worm sure to come, but no way to trap it on the surface and use it.

Kynes pitched forward onto the sand, returning to the shallow depression his movements had defined. He felt sand hot against his left cheek, but the sensation was remote.

"The Arrakeen environment built itself into the evolutionary pattern of native life forms," his father said. "How strange that so few people ever looked up from the spice long enough to wonder at the near ideal nitrogen-oxygen-CO_2 balance being maintained here in the absence of large areas of plant cover. The energy sphere of the planet is there to see and understand—a relentless process, but a process nonetheless. There is a gap in it? Then something occupies that gap. Science is made up of so many things that appear obvious after they are explained. I knew the Little Maker was there, deep in the sand, long before I ever saw it."

"Please stop lecturing me, father," Kynes whispered.

A hawk landed on the sand near his outstretched hand. Kynes saw it fold its wings, tip its head to stare at him. He summoned the energy to croak at it. The bird hopped away two steps, but continued to stare at him.

"Men and their works have been a disease on the surface of their planets before now," his father said. "Nature tends to compensate for diseases, to remove or encapsulate them, to incorporate them into the system in her own way."

The hawk lowered its head, stretched its wings, refolded them. It transferred its attention to his outstretched hand.

Kynes found that he no longer had the strength to croak at it.

"The historical system of mutual pillage and extortion stops here on Arrakis," his father said. "You cannot go on forever stealing what you need without regard to those who come after. The physical qualities of a planet are written into its economic and political record. We have the record in front of us and our course is obvious."

He never could stop lecturing, Kynes thought. *Lecturing, lecturing, lecturing—always lecturing.*

The hawk hopped one step closer to Kynes' outstretched hand, turned its head first one way and then the other to study the exposed flesh.

"Arrakis is a one-crop planet," his father said. "One crop. It supports a ruling class that lives as ruling classes have lived in all times while, beneath them, a semihuman mass of semislaves exists on the leavings. It's the masses and their leavings that occupy our attention. These are far more valuable than has ever been suspected."

"I'm ignoring you, father," Kynes whispered. "Go away."

And he thought: *Surely there must be some of my Fremen near. They cannot help but see the birds over me. They will investigate if only to see if there's moisture available.*

"The masses of Arrakis will know that we work to make the land flow with water," his father said. "Most of them, of course, will have only a semimystical understanding of how we intend to do this. Many, not understanding the prohibitive mass/ratio problem, may even think we'll bring water from some other planet rich in it. Let them think anything they wish as long as they believe in us."

In a minute I'll get up and tell him what I think of him, Kynes thought. *Standing there lecturing me when he should be helping me.*

The bird took another hop closer to Kynes' outstretched hand. Two more hawks drifted down to the sand.

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"Religion and law among our masses must be one and the same," his father said. "An act of disobedience must be a sin and require religious penalties. This will have the dual benefit of bringing both greater obedience and greater bravery. We must depend not so much on the bravery of individuals, you see, as upon the bravery of a whole population."

Where is my population now when I need it most? Kynes thought. He summoned all his trength, moved his hand a finger's width toward the nearest hawk. It hopped backward among its companions and all stood poised for flight.

"Our timetable will achieve the stature of a natural phenomenon," his father said. "A planet's life is a vast, tightly interwoven fabric. Vegetation and animal changes will be determined at first by the raw physical forces we manipulate. But as they establish themselves, our changes will become controlling influences in their own right—and we will have to deal with them, too. Keep in mind, though, that we need control only three per cent of the energy surface—only three per cent—to tip the entire structure over into our self-sustaining system."

Why aren't you helping me? Kynes wondered. *Always the same: when I need you most, you fail me.* He wanted to turn his head, to stare in the direction of his father's voice, stare the old man down. Muscles refused to answer his demand.

Kynes saw the hawk move. It approached his hand, a cautious step at a time while its companions waited in mock indifference. The hawk stopped only a hop away from his hand.

A profound clarity filled Kynes' mind. He saw quite suddenly a potential for Arrakis that his father had never seen. The possibilities along that different path flooded through him.

"No more terrible disaster could befall your people than for them to fall into the hands of a Hero," his father said.

Reading my mind! Kynes thought bitterly. *Well . . . let him.*

The messages already have been sent to my sietch villages, he thought. *Nothing can stop them. If the Duke's son is alive they'll find him and protect him as I have commanded. They may discard the woman, his mother, but they'll save the boy.*

The hawk took one hop that brought it within slashing distance of his hand. It tipped its head to examine the supine flesh. Abruptly, it straightened, stretched its head upward and with a single screech, leaped into the air and banked away overhead with its companions behind it.

They've come! Kynes thought. *My Fremen have found me!*

Then he heard the sand rumbling.

Every Fremen knew the sound, could distinguish it immediately from the noises of worms or other desert life. Somewhere beneath him, the pre-spice mass had accumulated enough water and organic matter from the Little Makers, had reached the critical stage of wild growth. A gigantic bubble of CO_2 was forming deep in the sand, heaving upward in an enormous "blow" with a dust whirlpool at its center. It would exchange what had been formed deep in the sand for whatever lay on the surface.

The hawks circled overhead screeching their frustration. They knew what was happening. Any desert creature would know.

And I am a desert creature, Kynes thought. *You see me, father? I am a desert creature.*

He felt the bubble lift him, felt it break and the dust whirpool engulf him, dragging him down into cool darkness. For a moment, the sensation of coolness and the moisture were blessed relief. Then, as his planet killed him, it occurred to Kynes that his father and all the other scientists were wrong, that the most persistent principles of the universe were accident and error.

Even the hawks could appreciate these facts.

IX

Prophecy and prescience—How can they be put to the test? Consider: How much is actual prediction and how much is the prophet shaping the future to fit his prophecy? What of the harmonic disruptions inherent in the act of prophecy? Does the prophet see the future or does he see a line of weakness, a fault of crystallization that he may shatter with words or decisions as a diamond cutter shatters his gem with a blow on a knife?

"Private Reflections on Muad'Dib"
by The Princess Irulan

Get their water!

The command called out of the night was specific.

Paul, aware that he had no prescient vision to guide him, fought down his fear, glanced at his mother. His trained eyes saw her readiness for battle.

"It would be regrettable should we have to destroy you out of hand," the voice above them said.

That's the one who spoke first, Jessica thought. There *are at least two of them—one to our right and one to the left.*

"Cignoro hrobosa sukares hin mange la pchagavas doi me kamavas na beslas lele pal hrobas!"

It was the man to their right calling out over the basin.

The words were gibberish to Paul, but he sensed meaning in them out of an unabsorbed possible future. An unfiled "memory" told him suddenly that one word meant "unkissed". . . strangers!

Jessica, out of her Bene Gesserit training, recognized the language: Chakobsa, an ancient hunting tongue. The man had said perhaps these were the strangers they sought.

In the sudden silence that followed the calling voice, the hoop-wheel face of the second moon—faintly ivory blue—rolled over the rocks across the basin, bright and peering.

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Scrambling sounds come from the rocks—above and to both sides . . . dark motions in the moonlight. Many figures flowed through the shadows.

A whole troop! Paul thought with a sudden pang.

A tall man in a mottled burnoose stepped in front of Jessica. His mouth baffle was thrown aside for clear speech, revealing a heavy beard in the sidelight of the moon, but face and eyes were hidden in the overhang of his hood.

"What have we here—jinn or human?" he asked.

And Jessica heard the true-banter in his voice. She allowed herself a faint hope. This was the voice of command, the voice that had first shocked them with its intrusion from the night.

"Human, I warrant," the man said.

Jessica sensed rather than saw the knife hidden in a fold of the man's robe. She permitted herself one bitter regret that she and Paul had no shields.

"Do you also speak?" the man asked.

Jessica put all the royal arrogance at her command into her manner and voice. Reply was urgent, but she had not heard enough of this man to be certain she had a register on his culture and weaknesses.

"Who comes on us like criminals out of the night?" she demanded.

The burnoose-hooded head showed tension in a sudden twist, then slow relaxation that revealed much. The man had good control.

Paul shifted away from his mother to separate them as targets and give each of them a clearer arena of action.

The hooded head turned at Paul's movement, opening a wedge of face to moonlight. Jessica saw a sharp nose, one glinting eye—*dark, so dark the eye without any white in it*—a heavy brow and upturned mustache.

"A likely cub," the man said. "If you're fugitives from the Harkonnens, it may be you're welcome among us. What is it, boy?"

The possibilities flashed through Paul's mind: *A trick? A fact?* Immediate decision was needed.

"Why should you welcome fugitives?" he demanded.

"A child who thinks and speaks like a man," the tall man said. "Well, now, to answer your question, my young *wali*, I am one who does not pay the *fai*, the water tribute to the Harkonnens. That is why I might welcome a fugitive."

He knows who we are, Paul thought. *There's concealment in his voice.*

"I am Stilgar, the Fremen," the tall man said. "Does that speed your tongue, boy?"

It is the same voice, Paul thought. And he remembered a time in Council with his father and this man—a tall Fremen who had come seeking the body of a friend slain by the Harkonnens.

"I know you, Stilgar," Paul said. "I was with my father in Council when you came for the water of your friend. You took away with you my father's man, Duncan Idaho—an exchange of friends."

"And Idaho abandoned us to return to his Duke," Stilgar said.

Jessica heard the shading of disgust in his voice, held herself prepared for attack.

The voice from the rocks above them called: "We waste time here, Stil."

"This is the Duke's son," Stilgar barked. "He's certainly the one Liet told us to seek."

"But . . . a child, Stil."

"The Duke was a man and this lad used a thumper," Stilgar said. "That was a brave crossing he made in the path of the *shaih-hulud*."

And Jessica heard him excluding her from his thoughts. Had he already passed sentence?

"We haven't time for the test," the voice above them protested.

"Yet he could be the Lisan al-Gaib we need," Stilgar said.

He's looking for an omen! Jessica thought.

"But the woman," the voice above them said.

Jessica readied herself anew. There had been death in that voice.

"Yes, the woman," Stilgar said. "And her water."

"You know the law," said the voice from the rocks. "Ones who cannot live with the desert . . ."

"Be quiet," Stilgar said. "Times change."

"Did Liet *command* this?" asked the voice from the rocks.

"You heard the voice of the cielago, Jamis," Stilgar said. "Why do you press me?"

And Jessica thought: *Cielago!* The clue of the tongue opened wide avenues of understanding: this was the language of Ilm and Fiqh, and cielago meant *bat*, a small flying mammal. *Voice of the cielago:* they had received a distrans message to seek Paul and herself.

"I but remind you of your duties, friend Stilgar," said the voice above them.

"My duty is the strength of the tribe," Stilgar said. "That is my only duty. I need no one to remind me of it. This child-man interests me. He is full fleshed. He has lived on much water. He has lived away from the father sun. He has not the eyes of the *ibad*. Yet, he does not speak or act like a weakling of the pans. Nor did his father. How can this be?"

"We cannot stay out here all night arguing," said the voice from the rocks. "If a patrol . . ."

"I will not tell you again, Jamis, to be quiet," Stilgar said.

The man above them remained silent, but Jessica heard him moving, crossing by a leap over a defile and working his way down to the basin floor on their left.

"The voice of the cielago suggested there'd be value to us in saving you two," Stilgar said. "I can see possibility in this strong boy-man: he is young and can learn. But what of yourself, woman?" He stared at Jessica.

I have his voice and pattern registered now, Jessica

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thought. *I could control him with a word, but he's a strong man . . . worth much more to us unblunted and with full freedom of action. We shall see.*

"I am the mother of this boy," Jessica said. "In part, his strength which you admire is the product of my training."

"The strength of a woman can be boundless," Stilgar said. "Certain it is in a Reverend Mother. Are you a Reverend Mother?"

For the moment, Jessica put aside the implications of the question, answered truthfully: "No."

"Are you trained in the ways of the desert?"

"No, but many consider my training valuable."

"We make our own judgments on value," Stilgar said.

"Every man has the right to his own judgments," she said.

"It is well that you see the reason," Stilgar said. "We cannot dally here to test you, woman. Do you understand? We'd not want your shade to plague us. I will take the boy-man, your son, and he shall have my countenance, sanctuary in my tribe. But for you, woman—you understand there is nothing personal in this? It is the rule, *Istislah,* in the general interest. Is that not enough?"

Paul took a half step forward. "What are you talking about?"

Stilgar flicked a glance across Paul, but kept his attention on Jessica. "Unless you've been deep-trained from childhood to live here, you could bring destruction onto an entire tribe. It is the law, and we cannot carry useless . . ."

Jessica's motion started as a slumping, deceptive faint to the ground. It was the obvious thing for a weak outworlder to do, and the obvious slows an opponent's reactions. It takes an instant to interpret a known thing when that thing is exposed as something unknown. She shifted as she saw his right shoulder drop to bring a weapon within the folds of his robe to bear on her new position. A turn, a slash of her arm, a whirling of mingled robes, and she was against the rocks with the man helpless in front of her.

At his mother's first movement, Paul backed two steps. As she attacked, he dove for shadows. A bearded man rose up in his path, half-crouched, lunging forward with a weapon in one hand. Paul took the man beneath the sternum with a straight-hand jab, sidestepped and chopped the base of his neck as he fell, relieving him of the weapon as he went down.

Then Paul was into the shadows, scrambling upward among the rocks, the weapon tucked into his waist sash. He had recognized it in spite of its unfamiliar shape—a projectile weapon, and that said many things about this place: another clue that shields were not used here.

They will concentrate on my mother and that Stilgar fellow. She can handle him. I must get to a safe vantage point where I can threaten them and give her time to escape.

There came a chorus of sharp spring-clicks from the basin. Projectiles whined off the rocks around him. One of them flicked his robe. He squeezed around a corner in the rocks, found himself in a narrow vertical crack, began inching upward—his back against one side, his feet against the other—slowly, as silently as he could.

The roar of Stilgar's voice echoed up to him: "Get back, you worm-headed lice! She'll break my neck if you come near!"

A voice out of the basin said: "The boy got away, Stil. What are we . . ."

"Of course he got away, you sand-brained . . . Ughhh! Easy woman!"

"Tell them to stop hunting my son," Jessica said.

"They've stopped, woman. He got away as you intended him to. Great Gods below! Why didn't you say you were a weirding woman and a fighter?"

"Tell your men to fall back," Jessica said. "Tell them to go out into the basin where I can see them . . . and you'd better believe that I know how many of them there are."

And she thought: *This is the delicate moment, but if this man is as sharp-minded as I think him, we have a chance.*

Paul inched his way upward, found a narrow ledge on which he could rest and look down into the basin. Stilgar's voice came up to him.

"And if I refuse? How can you . . . ughhh! Leave be, woman! We mean no harm to you, now. Great Gods! If you can do this to the strongest of us, you're worth ten times your weight of water. We don't destroy that which strengthens us."

Now, the test of reason, Jessica thought. She said: "You ask after the *Lisan al-Gaib.*"

"You could be the folk of the legend," he said, "but I'll believe that when it's been tested. All I know now is that you came here with that stupid Duke who . . . Aieeee! Woman! I care not if you kill me! He was honorable and brave, but it was stupid to put himself in the way of the Harkonnen fist!"

Silence.

Presently, Jessica said: "He had no choice, but we'll not argue it. Now, tell that man of yours behind the bush over there to stop trying to bring his weapon to bear on me, or I'll rid the Universe of you and take him next."

"You there!" Stilgar roared. "Do as she says!"

"But, Stil . . ."

"Do as she says, you wormfaced, crawling, sand-brained piece of lizard terd! Do it or I'll help her dismember you! Can't you see the worth of this woman?"

The man at the bush straightened from his partial concealment, lowered his weapon.

"He has obeyed," Stilgar said.

"Now," Jessica said, "explain clearly to your people what it is you wish of me. I want no young hothead to make a foolish mistake."

"When we slip into the villages and towns we must mask our origin, blend with the pan and graben folk,"

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Stilgar said. "We carry no weapons, for the crysknife is sacred. But you, woman, you have the weirding ability of battle. We'd only heard of it and many doubted, but one cannot doubt what he sees with his own eyes. You mastered an armed Fremen. *This* is a weapon no search could expose."

There was a stirring in the basin as Stilgar's words sank home.

"And if I agree to teach you the . . . weirding way?"

"My countenance for you as well as your son."

"How can we be sure of the truth in your promise?"

Stilgar's voice lost some of its subtle undertone of reasoning, took on an edge of bitterness. "Out here, woman, we carry no paper for contracts. We make no evening promises to be broken at dawn. When a man says a thing, that's the contract. As leader of my people, I've put them in bond to my word. Teach us this weirding way and you have sanctuary with us as long as you wish. Your water shall mingle with our water."

"Can you speak for all Fremen?" Jessica asked.

"In time, that may be. But only my brother, Liet, speaks for all Fremen. Here, I promise only secrecy. My people will not speak of you to any other sietch. The Harkonnens have returned to Dune in force and your Duke is dead. It is said that you two died in a Mother storm. The hunter does not seek dead game."

There's safety in that, Jessica thought. *But these people have good communications and a message could be sent.*

"I presume there was a reward offered for us," she said.

Stilgar remained silent, and she could almost see the thoughts turning over in his head, sensing the shifts of his muscles beneath her hands.

Presently, he said: "I will say it once more: I've given the Tribe's word-bond. My people know your worth to us now. What could the Harkonnens give us? Our freedom? Hah! No, you are the *taqwa,* that which buys us more than all the spice in the Harkonnen coffers."

"Then I shall teach you my way of battle," Jessica said, and she sensed the unconscious ritual-intensity of her own words.

"Now, you will release me?"

"So be it," Jessica said. She released her hold on him, stepped aside in full view of the band in the basin. *This is the test-mashad,* she thought. *But Paul must know about them even if I die for his knowledge.*

In the waiting silence, Paul inched forward to get a better view of where his mother stood. As he moved, he heard heavy breathing, suddenly stilled, above him in the vertical crack of the rock, and sensed a faint shadow there outlined against the stars.

Stilgar's voice came up from the basin: "You, up there! Stop hunting the boy. He'll come down presently."

The voice of a young boy or a girl sounded from the darkness above Paul: "But, Stil, he can't be far from . . ."

"I said leave him be, Chani! You spawn of a lizard!"

There came a whispered imprecation from above Paul and a low voice "Call *me* spawn of a lizard!" But the shadow pulled back out of view.

Paul returned his attention to the basin, picking out the gray-shadowed movement of Stilgar beside his mother.

"Come in, all of you," Stilgar called. He turned to Jessica. "And now I'll ask you how *we* may be certain you'll fulfill your half of our bargain? You're the one who lived with papers and empty contracts and such as . . ."

"We of the Bene Gesserit don't break our vows any more than you do," Jessica said.

There was a protracted silence, then a multiple hissing of voices: "A Bene Gesserit witch!"

Paul brought his captured weapon from his sash, trained it on the dark figure of Stilgar, but the man and his companions remained immobile, staring at Jessica.

"It *is* the legend," someone said.

"It was said that the Shadout Mapes gave this report on you," Stilgar said. "But a thing so important must be tested. If you are the Bene Gesserit of the legend whose son will lead us to paradise . . ." He shrugged.

Jessica sighed, thinking: *So our Missionaria Protectiva even planted religious safety valves in this hell hole. Ah, well . . . it'll help, and that's what it was meant to do.*

She said: "The seeress who brought you the legend, she gave it under the binding of *karama* and *ijaz,* the miracle and the inimitability of the prophecy—this I know. Do you wish a sign?"

His nostrils flared in the moonlight. "We cannot tarry for the rites," he whispered.

Jessica recalled a chart Kynes had shown her while arranging emergency escape routes. How long ago it seemed. There had been a place called "Sietch Tabr" on the chart and beside it the notation: "Stilgar."

"Perhaps when we get to Sietch Tabr," she said.

The revelation shook him, and Jessica thought: *If only he knew the tricks we use! She must've been good, that Bene Gesserit of the Missionaria Protectiva. These Fremen are beautifully prepared to believe in us.*

Stilgar shifted uneasily. "We must go now."

She nodded, letting him know that they left with her permission.

He looked up at the cliff almost directly at the rock ledge where Paul crouched. "You there, lad: you may come down now." He returned his attention to Jessica, spoke with an apologetic tone: "Your son made an incredible amount of noise climbing. He has much to learn lest he endanger us all, but he's young."

"No doubt we have much to teach each other," Jessica said. "Meanwhile, you'd best see to your companion out there. My noisy son was a bit rough in disarming him."

Stilgar whirled, his hood flapping. "Where?"

"Beyond those bushes." She pointed.

Stilgar touched two of his men. "See to it." He glanced

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at his companions, identifying them. "Jamis is missing." He turned to Jessica. "Even your cub knows the weirding way."

"And you'll notice that my son hasn't stirred from up there as you ordered," Jessica said.

The two men Stilgar had sent returned supporting a third who stumbled and gasped between them. Stilgar gave them a flicking glance, returned his attention to Jessica. "The son will take only your orders, eh? Good. He knows discipline."

"Paul, you may come down now," Jessica said.

Paul stood up, emerging into moonlight above his concealing cleft, slipped the Fremen weapon back into his sash. As he turned, another figure arose from the rocks to face him.

In the moonlight and reflection off gray stone, Paul saw a small figure in Fremen robes, a shadowed face peering out at him from the hood, and the muzzle of one of the projectile weapons aimed at him from a fold of robe.

"I am Chani, daughter of Liet."

The voice was lilting, half filled with laughter.

"I would not have permitted you to harm my companions," she said.

Paul swallowed. The figure in front of him turned into the moon's path and he saw an elfin face, black pits of eyes. The familiarity of that face, the features out of numberless visions in his earliest prescience, shocked Paul to stillness. He remembered the angry bravado with which he had once described this face from a dream, telling a Bene Gesserit Reverend Mother: "I will meet her."

And here was the face, but in no meeting he had ever dreamed.

"You were as noisy as *shaih-hulud* in a rage," she said. "And you took the most difficult way up here. Follow me; I'll show you an easier way down."

He scrambled out of the cleft, followed the swirling of her robe across a tumbled landscape. She moved like a gazelle, dancing over the rocks. Paul felt hot blood in his face, was thankful for the darkness.

That girl! She was like a touch of destiny. He felt caught up on a wave, in tune with a motion that lifted all his spirits.

They stood presently amidst the Fremen on the basin floor.

Jessica turned a wry smile on Paul, but spoke to Stilgar: "This will be a good exchange of teachings. I hope you and your people feel no anger at our violence. It seemed . . . necessary. You were about to . . . make a mistake."

"To save one from a mistake is a gift of paradise," Stilgar said. He touched his lips with his left hand, lifted the weapon from Paul's waist with the other, tossed it to a companion. "You will have your own maula pistol, lad, when you've earned it."

Paul started to speak, hesitated, remembering his mother's teaching: *"Beginnings are such delicate times."*

"My son has what weapons he needs," Jessica said. She stared at Stilgar, forcing him to think of how Paul had acquired the pistol.

Stilgar glanced at the man Paul had subdued—Jamis. The man stood at one side, head lowered, breathing heavily. "You are a difficult woman," Stilgar said. He held out his left hand to a companion, snapped his fingers. "Kushti bakka te."

More Chakobsa, Jessica thought.

The companion pressed two squares of gauze into Stilgar's hand. Stilgar ran them through his fingers, fixed one around Jessica's neck beneath her hood, fitted the other around Paul's neck in the same way.

"Now, you wear the kerchief of the *bakka,*" he said. "If we become separated, you will be recognized as belonging to Stilgar's sietch. We will talk of weapons another time."

He moved out through his band now, inspecting them, giving Paul's Fremkit pack to one of his men to carry.

Bakka, Jessica thought, recognizing the religious term: *bakka—the weeper.* She sensed how the symbolism of the kerchiefs united this band. *Why should weeping unite them?* she asked herself.

Stilgar came to the young girl who had embarrassed Paul, said: "Chani, take the child-man under your wing. Keep him out of trouble."

Chani touched Paul's arm. "Come along, child-man."

Paul hid the anger in his voice, said: "My name is Paul. It were well you . . ."

"We'll give you a name, manling," Stilgar said, "in the time of the *mihna,* at the test of aql."

The test of reason, Jessica translated. The sudden need of Paul's ascendancy overrode all other consideration, and she marked: "My son's been tested with the *gom jabbar!*"

In the stillness that followed, she knew she had struck to the heart of them.

"There's much we don't know of each other," Stilgar said. "But we tarry overlong. Day-sun musn't find us in the open." He crossed to the man Paul had struck down, said: "Jamis, can you travel?"

A grunt answered him. "Surprised me, he did. 'Twas an accident. I can travel."

"No accident," Stilgar said. "I'll hold you responsible with Chani for the lad's safety, Jamis. These people have my countenance."

Jessica stared at the man, Jamis. His was the voice that had argued with Stilgar from the rocks. His was the voice with death in it. And Stilgar had seen fit to reinforce his order with this Jamis.

Stilgar flicked a testing glance across the group, motioned two men out. "Larus and Farrukh, you are to hide our tracks. See that we leave no trace. Extra care—we have two with us who've not been trained." He turned, hand upheld and aimed across the basin. "In squad line

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with flankers—move out. We must be at Cave of the Ridges before dawn."

Jessica fell into step beside Stilgar, counting heads. There were forty Fremen—she and Paul made it forty-two. And she thought: *They travel as a military company—even the girl Chani.*

Paul took a place in the line behind Chani. He had put down the black feeling at being caught by the girl. In his mind now was the memory called up by his mother's barked reminder: *"My son's been tested with the gom jabbar!"*

He remembered the far away day on Caladan, lovely . . . soft . . . indolent Caladan. He remembered the wrinkle-faced old Reverend Mother Gaius Helen Mohiam, the agony she had inflicted on his hand to see if he would suffer it in the face of death. Paul found that his hand now tingled with the remembered pain.

"Watch where you go," Chani hissed. "Do not brush against a bush lest you leave a thread to show our passage."

Paul swallowed, nodded.

Jessica listened to the sounds of the troop, hearing her own footsteps and Paul's, marveling at the way the Fremen moved. They were forty people crossing the basin with only the sounds natural to the place—ghostly feluccas, their robes flitting through the shadows. Their destination was Sietch Tabr—Stilgar's sietch.

She turned the word over in her mind: *sietch.* It was a Chakobsa word, unchanged from the old hunting language out of countless centuries. *Sietch*: a meeting place in time of danger. The profound implications of the word and the language were just beginning to register with her after the tension of their encounter.

"We move well," Stilgar said. "With *Shaih-hulud's* favor, we'll reach Cave of the Ridges before dawn."

Jessica nodded, conserving her strength, sensing the terrible fatigue she held at bay by the force of will . . . and, she admitted it: by the force of elation. Her mind focused on the value of this troop, seeing what was revealed here about the Fremen culture.

All of them, she thought, *an entire culture trained to military order. What a priceless thing is here for an outcast Duke!*

X

The Fremen were supreme in that quality the ancients called "spannungsbogen"—which is the self-imposed delay between desire for a thing and the act of reaching out to grasp that thing.

"The Wisdom of Muad 'Dib"
by The Princess Irulan

They approached Cave of the Ridges at dawnbreak, moving through a split in the basin wall so narrow they had to turn sideways to negotiate it. Jessica saw Stilgar detach guards in the thin dawnlight, saw them for a moment as they began their scrambling climb up the cliff.

Paul turned his head upward as he walked, seeing the tapestry of this planet cut in cross section where the narrow cleft gaped toward gray-blue sky.

Chani pulled at his robe to hurry him, said: "Quickly. It already is light."

"The men who climbed above us, where are they going?" Paul whispered.

"The first daywatch," she said. "Hurry now!"

A guard left outside, Paul thought. *Wise. But it would've been wiser still for us to approach this place in separate bands. Less chance of losing the whole troop.* He paused in the thought, realizing that this was Guerrilla thinking, and he remembered his father's fear that the Atreides might become a Guerrilla House.

"Faster," Chani whispered.

Paul sped his steps, hearing the swish of robes behind. And he thought of the words of the *sirat* from the little OC Bible he had possessed once—his secret gift from Yueh who had betrayed them.

"Paradise on my right, Hell on my left and the Angel of Death behind." He rolled the quotation in his mind.

They rounded a corner where the passage widened. Stilgar stood at one side motioning them down into a low hole that opened at right angles to them.

"Quickly!" he hissed. "We're like rabbits in a cage if a patrol catches us here."

Paul bent for the opening, followed Chani into a cave illuminated by thin gray light from somewhere ahead.

"You can stand up," she said.

He straightened, studied the place: a deep and wide area with domed ceiling that curved away just out of a man's handreach. The troop spread out through shadows. Paul saw his mother come up on one side, saw her examine their companions. And he noted how she failed to blend with the Fremen even though her garb was identical. The way she moved—such a sense of power and grace.

"Find a place to rest and stay out of the way, child-man," Chani said. "Here's food." She pressed two leaf-wrapped morsels into his hand. They reeked of spice.

Stilgar came up behind Jessica, called an order to a group on the left. "Get the doorseal in place and see to moisture security." He turned to another Fremen: "Lemil, get glowglobes." He took Jessica's arm. "I wish to show you something, weirding woman." He led her around a curve of rock toward the light source.

Jessica found herself looking out across the wide lip of another opening to the cave, an opening high in a cliff wall—looking out across another basin about ten or twelve kilometers wide. The basin was shielded by high rock walls. Sparse clumps of plant growth was scattered around it.

As she looked at the dawn-gray basin, the sun lifted over the far escarpment illuminating a biscuit-colored landscape of rocks and sand. And she noted how the sun of Arrakis appeared to leap over the horizon.

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It's because we want to hold it back, she thought. *Night is safer than day.* There came over her then a longing for a rainbow in this place that would never see rain. *I must suppress such longings,* she thought. *They're a weakness. I no longer can afford weaknesses.*

Stilgar gripped her arm, pointed across the basin. "There! There you see proper Druses."

She looked where he pointed, saw movement: people on the basin floor scattering at the daylight into the shadows of the opposite cliffwall. In spite of the distance their movements were plain in the clear air. She lifted her binoculars from beneath her robe, focused the oil lenses on the distant people. Their kerchiefs fluttered like a flight of multi-colored butterflies.

"That is home," Stilgar said. "We will be there this night." He stared across the basin, tugging at his mustache. "My people stayed out overlate working. That means there are no patrols about. I'll signal them later and they'll prepare for us."

"Your people show good discipline," Jessica said. She lowered the binoculars, saw that Stilgar was looking at them.

"They obey the preservation of the tribe," he said. "It is the way we choose among us for a leader. The leader is the one who is strongest, the one who brings water and security." He lifted his attention to her face.

She returned his stare, noted the whiteless eyes, the stained eyepits, the dust-rimmed beard and mustache, the line of the catchtube curving down from his nostrils into his stillsuit.

"Have I compromised your leadership by besting you, Stilgar?" she asked.

"You did not call me out," he said.

"It's important that a leader keep the respect of his troop," she said.

"Isn't a one of those sandlice I cannot handle," Stilgar said. "When you bested me, you bested us all. Now, they hope to learn from you . . . the weirding way . . . and some are curious to see if you intend to call me out."

She weighed the implications. "By besting you in formal battle?"

He nodded. "I'd advise you against this because they'd not follow you. You're not of the sand. They saw this in our night's passage."

"Practical people," she said.

"True enough." He glanced at the basin. "We know our needs. But not many are thinking deep thoughts now this close to home. We've been out overlong arranging to deliver our spice quota to the Free Traders for the cursed Guild . . . may their faces be forever black."

Jessica stopped in the act of turning away from him, looked back up into his face. "The Guild? What has the Guild to do with your spice?"

"It's Liet's command," Stilgar said. "We know the reason, but the taste of it sours us. We bribe the Guild with a monstrous payment in spice to keep our skies clear of satellites and such that none may spy what we do to the face of Arrakis."

She weighed out her words, remembering that Paul once had said this must be the reason Arrakeen skies were clear of satellites. "And what is it you do to the face of Arrakis that must not be seen?"

"We change it . . . slowly but with certainty . . . to make it fit for human life. Our generation will not see it, nor our children or our children's children or the grandchildren of their children . . . but it will come." He stared with veiled eyes out over the basin. "Open water and tall green plants and people walking freely without stillsuits."

So that's the dream of this Liet-Kynes, she thought. And she said: "Bribes are dangerous; they have a way of growing larger and larger."

"They grow," he said, "but the slow way is the safe way."

Jessica turned, looked out over the basin, trying to see it the way Stilgar was seeing it in his imagination. She saw only the grayed mustard stain of distant rocks and a sudden hazy motion in the sky above the cliffs.

"Ahhhh," Stilgar said.

She thought at first it must be a patrol vehicle, then realized it was a mirage—another landscape hovering over the desert: sand and a distant wavering of greenery and in the middle distance a long worm traveling the surface with what looked like Fremen robes fluttering on its back.

The mirage faded.

"It would be better to ride," Stilgar said, "but we cannot permit a Maker into this basin."

Maker—their word for worm, she thought.

She measured the import of his words, the statement that they could not *permit* a worm into this basin. She knew what she had seen in the mirage—Fremen riding on the back of a giant worm. It took heavy control not to betray her shock at the implications.

"We must be getting back to the others," Stilgar said. "Else my people may suspect I dally with you. Some already are jealous that my hands tasted your loveliness when we struggled last night in Tuono Basin."

"That will be enough of that!" Jessica snapped.

"No offense," Stilgar said, and his voice was mild. "Women among us are not taken against their will . . . and with you"—he shrugged—"even that convention isn't required."

"You will keep in mind that I was a Duke's lady," she said, but her voice was calmer.

"As you wish," he said. "It's time to seal off this opening, to permit relaxation of stillsuit discipline. My people need to rest in comfort this day. Their families will give them little rest on the morrow."

Silence fell between them.

Jessica stared out into the sunlight. She had heard what she had heard in Stilgar's voice—the unspoken offer of more than his *countenance.* Did he need a wife? She realized she could step into that place with him. It would

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be one way to end conflict over tribal leadership—female properly aligned with male.

But what of Paul then? Who could tell yet what rules of parenthood prevailed here? And what of the unborn daughter she had carried these few weeks? What of a dead Duke's daughter? And she permitted herself to face fully into the significance of this other child growing within her, to see her own motives in permitting the conception. She knew what it was—she had succumbed to that profound drive shared by all creatures who are faced with death—the drive to seek immortality through progeny. The fertility drive of the species had overpowered them.

Jessica glanced at Stilgar, saw that he was studying her, waiting. *A daughter born here to a woman wed to such a one as this man—what would be the fate of such a daughter?* she asked herself. *Would he try to limit the necessities that a Bene Gesserit must follow?*

Stilgar cleared his throat and revealed then that he understood some of the questions in her mind. "What is important for a leader is that which makes him a leader. It is the needs of his people. If you teach me your powers, there may come a day when one of us must challenge the other. I would prefer some alternative."

"There are several alternatives?" she asked.

"The Sayyadina," he said. "Our Reverend Mother is old."

Their Reverend Mother!

Before she could probe this, he said: "I do not necessarily offer myself as mate. This is nothing personal for you are beautiful and desirable. But should you become one of my women, that might lead some of my young men to believe that I'm too much concerned with pleasures of the flesh and not enough concerned with the Tribe's needs. Even now they listen to us and watch us."

A man who weighs his decisions, who thinks of consequences, she thought.

"There are those among my young men who have reached the age of wild spirits," he said. "They must be eased through this period. I must leave no great reasons around for them to challenge me. Because I would have to maim and kill among them. This is not the proper course for a leader if it can be avoided with honor. A leader, you see, is one of the things that distinguishes a mob from a People. He maintains the level of individuals. Too few individuals and a People reverts to a mob."

His words, the depth of their awareness, the fact that he spoke as much to her as to those who secretly listened, forced her to re-evaluate him.

He has stature, she thought. *Where did he learn such inner balance?*

"The law that demands our form of choosing a leader is a just law," Stilgar said. "But it does not follow that justice is always the thing a People needs. What we truly need now is time to grow and prosper, to spread our force over more land."

What is his ancestry? she wondered. *Whence comes such breeding?* She said: "Stilgar, I underestimated you."

"Such was my suspicion," he said.

"Each of us apparently underestimated the other."

"I should like an end to this," he said. "I should like friendship with you . . . and trust. I should like that respect for each other which grows in the breast without demand for the huddlings of sex."

"I understand," she said.

"Do you trust me?"

"I hear your sincerity."

"Among us," he said, "the Sayyadina, when they are not the formal leaders, hold a special place of honor. They teach. They maintain the strength of God here." He touched his breast.

Now, I must probe this Reverend Mother mystery, she thought. And she said: "You spoke of your Reverend Mother . . . and I've heard words of legend and prophecy."

"It is said that a Bene Gesserit and her offspring hold the key to our future," he said.

"Do you believe I am that one."

She watched his face, thinking: *The young reed dies so easily. Beginnings are times of such great peril.*

"We do not know," he said.

She nodded, thinking: *He's an honorable man. He wants a sign from me, but he'll not tip fate by telling me the sign.*

Jessica turned her head, stared down into the basin at the golden shadows, the purple shadows, the vibrations of dust-mote air across the lip of their cave. Her mind was filled suddenly with feline prudence. She knew the cant of the Missionaria Protectiva, knew how to adapt the techniques of legend and fear and hope to her emergency needs, but she sensed wild changes here . . . as though someone had been in here among the Fremen and capitalized on the Missionaria Protectiva's imprint.

Stilgar cleared his throat.

She sensed his impatience, knew that the day moved ahead and men waited to seal off this opening. This was a time for boldness on her part, and she realized what she needed: some *dar al-hikman,* some *school of translation* that would give her . . .

"Adab," she whispered.

Her mind felt as though it had rolled over within her. She recognized the sensation with a quickening of pulse. Nothing in all the Bene Gesserit training carried such a signal of recognition. It could be only the *adab,* the *demanding memory that comes upon you of itself.* She gave herself up to it, allowing the words to flow from her.

"Ibn qirtaiba," she said, "as far as the spot where the dust ends." She stretched out an arm from her robe, seeing Stilgar's eyes go wide. She heard a rustling of many robes in the background. "I see a . . . Fremen with the book of examples," she intoned. "He reads to *al-Lat,* the sun whom he defied and subjugated. He reads to the *Sadus* of the Trial and this is what he reads:

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"Mine enemies are like green blades eaten down
That did stand in the path of the tempest.
Hast thou not seen what our Lord did?
He sent the pestilence among them
That did lay schemes against us.
They are like birds scattered by the huntsmen.
Their schemes are like pellets of poison
That every mouth rejects."

A trembling passed through her. She dropped her arm.

Back to her from the inner cave's shadows came a whispered response of many voices: "Their works have been overturned."

"The fire of God mount over thy heart," she said. And she thought: *Now it goes in the proper channel.*

"The fire of God set alight," came the response.

She nodded. "Thine enemies shall fall," she said.

"Bi-la kaifa," they answered.

In the sudden hush, Stilgar bowed to her. "Sayyadina," he said. "If the Shai-hulud grant, then you may yet pass within to become a Reverend Mother."

Pass within, she thought. *An odd way of putting it. But the rest of it fitted into the cant well enough.* And she felt a cynical bitterness at what she had done. *Our Missionaria Protectiva seldom fails. A place was prepared for us in this wilderness. The* prayer of the salat *has carved out our hiding place. Now . . . I must play the part of Auliya, the Friend of God . . .* Sayyadina *to rogue peoples who've been so heavily imprinted with our Bene Gesserit soothsay they even call their chief priestesses Reverend Mothers.*

Paul stood beside Chani in the shadows of the inner cave. He could still taste the morsel she had fed him—bird flesh and grain bound with spice honey and encased in a leaf. In tasting it he had realized he never before had eaten such a concentration of spice essence and there had been a moment of fear. He knew what this essence could do to him—the *spice change* that pushed his mind into prescient awareness.

"Bi-la kaifa," Chani whispered.

He looked at her, seeing the awe with which the Fremen appeared to accept his mother's words. Only the man called Jamis seemed to stand aloof from the ceremony, holding himself apart with arms folded across his breast.

"Duy yakha hin mange," Chani whispered. "Duy punra hin mange. I have two eyes. I have two feet."

She stared at Paul with a look of wonder.

Paul took a deep breath, tried to still the tempest in his breast. His mother's words had locked onto the working of the spice essence within him. He had felt her voice rise and fall there like the shadows of an open fire. And through it all, he had sensed the cynicism in her voice—he knew her so well!—but nothing could stop this metamorphosis.

Terrible Purpose!

He sensed the Race Consciousness that he could not escape. There came the breakthrough of sharpened clarity, the inflow of data, the precise awareness. He sank to the floor with his back against rock, gave himself up to the Time vision within that timeless stratum. He felt the winds of the future and the winds of the past—the one-eyed vision of the past, the one-eyed vision of the present and/shift the one-eyed vision of the future. All combined in a trinocular vision of Time-become-space. The possible futures flowed through him, deposited their experiences and were gone, leaving the detritus to be absorbed or rejected.

He felt the danger of overrunning himself, and he had to clutch at awareness of the present, sensing the blurred deflection of experiences, the multi-flowing moments, the continual solidification of that-which-is into perpetual-past.

In holding to the present, he felt for the first time the massive steadiness of Time's primary current, saw the everywhere-movement of eddies complicated waves, surges and counter surges—like surf dashing against rocky cliffs.

With abrupt infolding, he realized that prescience incorporated the limits of what is revealed—at once a source of accuracy and meaningful error. A kind of Heisenberg indeterminacy intervened: the expenditure of energy that revealed what he saw changed what he saw.

And what he saw was a Time nexus within this cave, a boiling of possibilities focused here, wherein the most minute action—the wink of an eye, a careless word, a misplaced grain of sand—moved a gigantic lever across the known universe. He saw violence with the outcome subject to so many variables that his slightest movement created vast shiftings in the pattern.

The vision made him want to freeze into immobility, but this, too, was action with its consequences.

The countless consequences—lines fanned out from this cave, and along most of these consequence-lines he saw his own dead body with blood flowing from a gaping knife wound.

XI

Perhaps you can understand it if you think of a man riding in a tiny boat—in a coracle—on a stormy sea. If conditions are right, he will be able to see around him toward limits something like these: When the coracle is in the trough, he sees flanks of adjoining waves; when his coracle rises to a wave crest, he sees two troughs and flanks of his own wave complex and the peaks of many waves. Troughs of subsequent waves, however, are increasingly hidden from the eye in the coracle. If you will permit a bad pun, then, the eye in the coracle is the oracle with a limited "sea."

"Muad 'Dib: Reflections on Time"
by The Princess Irulan

Jessica awakened in cave darkness, sensing the stir of Fremen around her, smelling the acrid stillsuit odor. Her inner timesense told her it would soon be night outside,

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but the cave remained in blackness, shielded from the desert by the plastic hoods that trapped their body moisture within this space.

She realized that she had permitted herself the utterly relaxing sleep of great fatigue, and this suggested something of her own unconscious assessment on personal security within this troop. She turned in the hammock that had been fashioned of her robe, slipped her feet to the rock floor and into her desert boots.

I must remember to fasten the boots slip-fashion to help by stillsuit's pumping action, she thought. *There are so many things to remember.*

She could still taste their morning meal—the morsel of bird flesh and grain bound within a leaf with spice honey—and it came to her that the use of time was turned around here: night was the day of activity and the day was a time of rest.

Night conceals; night is safest.

She unhooked her robe from its hammock pegs in a rock alcove, fumbled with the fabric in the dark until she found the top, slipped into it.

How to get a message out to the Bene Gesserits? she wondered. They would have to be told of the two strays in Arrakeen sanctuary.

Glowtubes and globes came alight farther into the cave. She saw people moving there, Paul among them already dressed and with his hood thrown back to reveal the aquiline Atreides profile.

He had acted so strangely before they retired, she thought. *Withdrawn.* He was like one come back from

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the dead, not yet fully aware of his return, his eyes half shut and glassy with the inward stare. It made her think of his warning about the spice-impregnated diet: *addictive.*

Are there side effects? she wondered. *He said it had something to do with his prescient faculty, but he has been strangely silent about what he sees.*

Stilgar came from shadows to her right, crossed to the group beneath the glowtubes. She marked how he fingered his beard and his watchful, cat-stalking look.

Abrupt fear shot through Jessica as her senses awakened to the tensions visible in the people gathered around Paul—the stiff movements, the ritual positions.

"They have my countenance!" Stilgar rumbled.

Jessica recognized the man Stilgar confronted—Jamis! She saw then the rage in Jamis—the tight set of his shoulders.

Jamis, the man Paul bested! she thought.

"You know the rule, Stilgar," Jamis said.

"Who knows it better?" Stilgar asked, and she heard the tone of placation in his voice, the attempt to smooth something over.

"I choose the combat," Jamis growled.

Jessica sped across the cave, grasped Stilgar's arm. "What is this?" she asked.

"It is the *amtal* rule," Stilgar said. "Jamis is demanding the right to test your part in the legend."

"She must be championed," Jamis said. "If her champion wins, that's the truth in it. But it's said"—he glanced across the press of people—"that she'd need no champion

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from the Fremen—which can mean only that she brings her own champion."

He's talking of single combat with Paul! Jessica thought.

She released Stilgar's arm, took a half step forward. "I'm always my own champion," she said. "The meaning's simple enough for . . ."

"You'll not tell us our ways!" Jamis snapped. "Not without more proof than I've seen. Stilgar could've told you what to say last morning. He could've filled your mind full of the coddle and you could've bird-talked it to us, hoping to make a false way among us."

I can take him, Jessica thought, *but that might conflict with the way they interpret the legend.* And again she wondered at the way the Missionaria Protectiva's work had been twisted on this planet.

Stilgar looked at Jessica, spoke in a low voice but one designed to carry to the crowd's fringe. "Jamis is one to hold a grudge, Sayyadina. Your son bested him and . . ."

"It was an accident!" Jamis roared. "There was witch-force at Tuono Basin and I'll prove it now!"

". . . And I've bested him myself," Stilgar continued. "He seeks by this *tahaddi*-challenge to get back at me as well. There's too much of violence in Jamis for him ever to make a good leader. He has too much *ghafla,* the distraction. He gives his mouth to the rules and his heart to the *sarfa,* the turning away. No, he could never make a good leader. I've preserved him this long because he's useful in a fight as such, but when he gets this carving anger on him he's dangerous to his own society."

"Stilgarrrr!" Jamis rumbled.

And Jessica saw what Stilgar was doing, trying to enrage Jamis, to take the challenge away from Paul.

Stilgar faced Jamis, and again Jessica heard the soothing in the rumbling voice. "Jamis, he's but a boy. He's . . ."

"You named him a man," Jamis said. "His mother *says* he's been through the *gom jabbar.* He's full-fleshed and with a surfeit of water. The ones who carried their pack say there's literjons of water in it. Literjons! And us slipping our catchpockets the instant they show dewsparkle."

Stilgar glanced at Jessica. "Is this true? Is there water in your pack?"

"Yes."

"Literjons of it?"

"Two literjons."

"What was intended with this wealth?"

Wealth? she thought. She shook her head, feeling the coldness in his voice.

"Where I was born, water fell from the sky and ran over the land in wide rivers," she said. "There were oceans of it so broad you could not see the other shore. I've not been trained to your water discipline. I never before had to think of it this way."

A sighing gasp arose from the people around them: "Water fell from the sky . . . it ran *over* the land."

"Did you know there're those among us who've lost from their catchpockets by accident and will be in sore trouble before we reach Tabr this night?"

"How could I know?" Jessica shook her head. "If they're in need, give them water from our pack."

"Is that what you intended with this wealth?"

"I intended it to save life," she said.

"Then we accept your blessing, Sayyadina."

"You'll not buy us off with water," Jamis growled. "Nor will you anger me against yourself, Stilgar. I see you trying to make me call you out before I've proved my words."

Stilgar faced Jamis. "Are you determined to press this fight against a child, Jamis?" His voice was low, venomous.

"She must be championed."

"Even though she has my countenance?"

"I invoke the *amtal* rule," Jamis said. "It's my right."

Stilgar nodded. "Then, if the boy does not carve you down, you'll answer to my knife afterward. And this time I'll not hold back the blade as I've done before."

"You cannot do this thing," Jessica said. "Paul's just . . ."

"You must not interfere, Sayyadina," Stilgar said. "Oh, I know you can take me and, therefore, can take anyone among us, but you cannot best us all united. This must be: it is the *amtal* rule."

Jessica fell silent, staring at him in the green light of the glowtubes, seeing the demoniacal stiffness that had taken over his expression. She shifted her attention to Jamis, saw the brooding look to his brows and thought: *I should've seen that before. He broods. He's the silent kind, one who works himself up inside. I should've been prepared.*

"If you harm my son," she said, "you'll have me to meet. I call you out now. I'll carve you into a joint of . . ."

"Mother." Paul stepped forward, touched her sleeve. "Perhaps if I explain to Jamis how . . ."

"Explain!" Jamis sneered.

Paul fell silent, staring at the man. He felt no fear of him. Jamis appeared clumsy in his movements and he had fallen so easily in their night encounter on the sand. But Paul still felt the nexus-boiling of this cave, still remembered the prescient visions of himself dead under a knife. There had been so few avenues of escape for him in that vision . . .

Stilgar said: "Sayyadina, you must step back now where . . ."

"Stop calling her Sayyadina!" Jamis said. "That's yet to be proved. So she knows the prayer! What's that? Every child among us knows it."

He has talked enough, Jessica thought. *I've the key to him. I could immobilize him with a word.* She hesitated. *But I cannot stop them all.*

"You will answer to me then," Jessica said, and she

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pitched her voice in a twisting tone with a little whine in it and a catch at the end.

Jamis stared at her, fright visible on his face.

"I'll teach you agony," she said in the same tone. "Remember *that* as you fight. You'll have agony such as will make the *gom jabber* a happy memory by comparison. You will writhe with your entire . . ."

"She tries a spell on me!" Jamis gasped. He put his clenched right fist beside his ear. "I invoke the silence on her!"

"So be it then," Stilgar said. He cast a warning glance at Jessica. "If you speak again, Sayyadina, we'll know it's your witchcraft and you'll be forfeit." He nodded for her to step back.

Jessica felt hands pulling her, helping her back, and she sensed they were not unkindly. She saw Paul being separated from the throng, the elfin-faced Chani whispering in his ear as she nodded toward Jamis.

A ring formed within the troop. More glowglobes were brought and all of them tuned to the yellow band.

Jamis stepped into the ring, slipped out of his robe and tossed it to someone in the crowd. He stood there in a cloudy gray slickness of stillsuit that was patched and marked by tucks and gathers. For a moment, he bent with his mouth to his shoulder, drinking from a catch-pocket tube. Presently, he straightened, peeled off and detached the suit, handed it carefully into the crowd. He stood waiting, clad in loincloth and some tight fabric over his feet, a crysknife in his right hand.

Jessica saw the girlchild Chani helping Paul, saw her press the crysknife handle into his palm, saw him heft it, testing the weight and balance. And it came to Jessica that Paul had been trained in *prana* and *bindu*, the nerve and the fiber—that he had been taught fighting in a deadly school, his teachers men like Duncan Idaho and Gurney Halleck, men who were legends in their own lifetimes. The boy knew the devious ways of the Bene Gesserit and he looked supple and confident.

But he's only fifteen, she thought. *And he has no shield. I must stop this. Somehow, there must be a way to . . .* She looked up, saw Stilgar watching her.

"You cannot stop it," he said. "You must not speak."

She put a hand over her mouth, thinking: *I've planted fear in Jamis' mind. It'll slow him some . . . perhaps. If I could only pray—truly pray.*

Paul stood alone now just into the ring, clad in the fighting trunks he'd worn under his stillsuit. He held a crysknife in his right hand; his feet were bare against the sand-gritted rock. Idaho had warned him time and again: *"When in doubt of your surface, bare feet are best."* And there were Chani's words of instruction still in the front of his consciousness: *"Jamis turns to the right with his knife after a parry. It's a habit we've all seen. And he'll aim for the eyes to catch a blink in which to slash you. And he can fight either hand; look out for a knife shift."*

But strongest in Paul so that he felt it with his entire body was the training and the instinctual reaction mechanism that had been hammered into him day after day, hour after hour on the practice floor.

Gurney Halleck's words were there to remember: *"The good knife fighter thinks on both point and blade and shearing-guard simultaneously. The point can also cut; the blade can also stab; the shearing-guard can also trap your opponent's blade."*

Paul glanced at the crysknife. There was no shearing-guard; only the slim round ring of the handle with its raised lips to protect the hand. And even so, he realized that he did not know the breaking tension of this blade, did not even know if it *could* be broken.

Jamis began sidling to the right along the edge of the ring opposite Paul.

Paul crouched, realizing then that he had no shield, but was trained to fighting with its subtle field around him, trained to react on defense with utmost speed while his attack would be timed to the controlled slowness necessary for penetrating the enemy's shield. In spite of constant warning from his trainers not to depend on the shield's mindless blunting of attack speed, he knew that shield-awareness was part of him.

Jamis called out in ritual challenge: "May thy knife chip and shatter!"

This knife will break then, Paul thought.

He cautioned himself that Jamis also was without shield, but the man wasn't trained to its use, had no shield-fighter inhibitions.

Paul stared across the ring at Jamis. The man's body looked like knotted whipcord on a dried skeleton. His crysknife shone milky yellow in the light of the glowtubes.

Fear coursed through Paul. He felt suddenly alone and naked standing in dull yellow light within this ring of people. Prescience had fed his knowledge with countless experiences, hinted at the strongest currents of the future and the strings of decision that guided them, but this was the *real-now.* This was death hanging on an infinite number of minuscule mischances.

Anything could tip the future here, he realized. Someone coughing in the troop of watchers, a distraction. A variation in a glowglobe's brilliance, a deceptive shadow.

I'm afraid, Paul told himself.

And he circled warily opposite Jamis, repeating silently to himself the Bene Gesserit litany against fear. *"Fear is the mind-killer . . ."* It was a cool bath washing over him. He felt muscles untie themselves, become poised and ready.

"I'll sheath my knife in your blood," Jamis snarled. And in the middle of the last word, he pounced.

Jessica saw the motion, stifled an outcry.

Where the man struck there was only empty air and Paul stood now behind Jamis with a clear shot at the exposed back.

Now, Paul! Now! Jessica screamed it in her mind.

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But Paul's motion was slowly timed, beautifully fluid, but so slow it gave Jamis the margin to twist away, backing and turning to the right.

Paul withdrew, crouching low. "First, you must find my blood," he said.

Jessica recognized the shield-fighter timing in her son, and it came over her what a two-edged thing that was. The boy's reactions were those of youth and trained to a peak these people had never seen. But the attack was trained, too, and conditioned by the necessities of penetrating a shield barrier. A shield would repel too fast a blow, admit only the slowly deceptive counter. It needed control and trickery to get through a shield.

Does Paul see it? she asked herself. *He must!*

Again Jamis attacked, ink-dark eyes glaring, his body a yellow blur under the glowglobes.

And again Paul slipped away to return too slowly on the attack.

And again.

And again.

Each time, Paul's counterblow came an instant late.

And Jessica saw a thing she hoped Jamis did not see. Paul's defensive reactions were blindingly fast, but they moved each time at the precisely correct angle they would take if a shield were helping deflect part of Jamis' blow.

"Is your son playing with that poor fool?" Stilgar asked. He waved her to silence before she could respond. "Sorry; you must remain silent."

Now, the two figures on the rock floor circled each other: Jamis with knife hand held far forward and tipped up slightly; Paul crouched with knife held low.

Again, Jamis pounced, and this time he twisted to the right where Paul had been dodging.

Instead of faking back and out, Paul met the man's knife hand on the point of his own blade. Then the boy was gone, twisting away to the left and thankful for Chani's warning.

Jamis backed into the center of the circle, rubbing his knife hand. Blood dripped from the injury for a moment, stopped. His eyes were wide and staring—two blue-black holes—studying Paul with a new wariness in the dull light of the glowglobes.

"Ah, that one hurt," Stilgar murmured.

Paul crouched at the ready and, as he had been trained to do after first blood, called out: "Do you yield?"

"Hah!" Jamis cried.

An angry murmur arose from the troop.

"Hold!" Stilgar called out. "The lad doesn't know our rule." Then, to Paul: "There can be no yielding in the *tahaddi*-challenge. Death is the test of it."

Jessica saw Paul swallow hard. And she thought: *He's never killed a man like this . . . in the hot blood of a knife fight. Can he do it?*

Paul circled slowly right, forced by Jamis' movement. The prescient knowledge of the Time-boiling variables in this cave came back to plague him now. His new understanding of those variables told him there were too many swiftly-compressed decisions in this fight to the death for any clear channel ahead to show itself.

Variable piled on variable—that was why this cave lay as a blurred nexus in this path—a place where numberless vital decisions came to focus. It was like a gigantic rock in the path of the flood, creating maelstroms in the current around it.

"Have an end to it, lad," Stilgar muttered. "Don't play with him."

Paul crept farther into the ring, relying on his own edge in speed.

Jamis backed now that the realization swept over him —that this was no soft offworlder in the *tahaddi* ring, easy pray for a Fremen crysknife.

Jessica saw the shadow of desperation in the man's face. *Now is when he's most dangerous,* she thought. *Now, he's desperate and can do anything. He sees that this is not like a child of his own people, but a fighting machine born and trained to it from infancy. Now, the fear I planted in him has come to bloom.*

And she found in herself a sense of pity for Jamis—and emotion tempered by awareness of the immediate peril to her son.

Jamis could do anything . . . any unpredictable thing, she told herself. She wondered then if Paul had glimpsed this future, if he were reliving this experience. But she saw the way her son moved, the beads of perspiration on his face and shoulders, the careful wariness visible in the flow of muscles. And for the first time, she sensed without understanding it, the uncertainty factor in Paul's gift.

Paul pressed the fight now, circling but not attacking. He had seen the fear in his opponent. Memory of Duncan Idaho's voice flowed through Paul's awareness: *"When your opponent fears you, then's the moment when you give the fear its own rein, give it the time to work on him. Let it become terror. The terrified man fights himself. Eventually, he attacks in desperation. That is the most dangerous moment, but the terrified man can be trusted usually to make a fatal mistake. You are being trained here to detect these mistakes and use them."*

The crowd in the cavern began to mutter.

They think Paul's toying with Jamis, Jessica thought. *They think Paul's being needlessly cruel.*

But she sensed also the undercurrent of crowd excitement, their enjoyment of the spectacle. And she could see the pressure building up in Jamis. The moment when it became too much for him to contain was as apparent to her as it was to Jamis . . . or to Paul.

Jamis leaped high, feinting and striking down with his right hand, but the hand was empty. The crysknife had been shifted to his left hand.

Jessica gasped.

But Paul had been warned by Chani: *"Jamis fights with either hand."* And the depth of his training had taken in that trick *en passant. "Keep the mind on the knife and not on the hand that holds it,"* Gurney Halleck

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had told him time and again. *"The knife is more dangerous than the hand and the knife can be in either hand."*

And Paul had seen Jamis' mistake: bad footwork so that it took the man a heartbeat longer to recover from his leap which had been intended to confuse Paul and hide the knife shift.

Except for the low yellow light of the glowglobes and the inky eyes of the staring troop, it was similar to a session on the practice floor. Shields didn't count where the body's own movement could be used against it. Paul shifted his own knife in a blurred motion, slipped sideways and thrust upward where James' chest was descending—then away to watch the man crumble.

Jamis fell like a limp rag, face down, gasped once and turned his face toward Paul, then lay still on the rock floor. His dead eyes stared out like beads of dark glass.

"Killing with the point lacks artistry," Idaho had once told Paul, *"but don't let that hold your hand when the opening presents itself."*

The troop rushed forward, filling the ring, pushing Paul aside. They hid Jamis in a frenzy of huddling activity. Presently, a group of them hurried back into the depths of the cavern carrying a burden wrapped in a robe.

And there was no body on the rock floor.

Jessica pressed through toward her son. She felt that she swam in a sea of robed and stinking backs, a throng strangely silent.

Now is the terrible moment, she thought. *He has killed a man in clear superiority of mind and muscle. He must not grow to enjoy such a victory.*

She forced herself through the last of the troop and into a small open space where two bearded Fremen were helping Paul into his stillsuit.

Jessica stared at her son. Paul's eyes were bright. He breathed heavily, permitting the ministrations to his body rather than helping them.

"Him against Jamis and not a mark on him," one of the men muttered.

Chani stood at one side, her eyes focused on Paul. Jessica saw the girl's excitement, the admiration in the elfin face.

It must be done now and swiftly, Jessica thought.

She compressed ultimate scorn into her voice and manner, said: "Wellll, now—how does it feel to be a killer?"

Paul stiffened as though he had been struck. He met his mother's cold glare and his face darkened with a rush of blood. Involuntarily, he glanced toward the place on the cavern floor where Jamis had lain.

Stilgar pressed through to Jessica's side, returning from the cave depths where the body of Jamis had been taken. He spoke to Paul in a bitter, controlled tone. "When the time comes for you to call me out and try for my *burde,* do not think you will play with me the way you played with Jamis."

Jessica sensed the way her own words and Stilgar's sank into Paul, doing their harsh work on the boy. The mistake these people made—it served a purpose now. She searched the faces around them as Paul was doing, seeing what he saw. Admiration, yes, and fear . . . and in some—loathing. She looked at Stilgar, saw his fatalism, knew how the fight had seemed to him.

Paul looked at his mother. "You know what it was," he said.

She heard the return to sanity, the remorse in his voice. Jessica swept her glance across the troop, said: "Paul has never before killed a man with a naked blade."

Stilgar faced her, disbelief in his face.

"I wasn't playing with him," Paul said. He pressed in front of his mother, straightening his robe, glanced at the dark place of Jamis' blood on the cavern floor. "I did not want to kill him."

Jessica saw belief come slowly to Stilgar, saw the relief in him as he tugged at his beard with a deeply veined hand. She heard muttering awareness spread through the troop.

"That's why y' asked him to yield," Stilgar said. "I see. Our ways are different, but you'll see the sense in them. I thought we'd admitted a scorpion into our midst." He hesitated, then: "And I shall not call you lad the more."

A voice from the troop called out: "Needs a naming, Stil."

Stilgar nodded, tugging at his beard. "I see strength in you . . . like the strength beneath a pillar." Again he hesitated, then: "You shall be known among us as Usul, the base of the pillar. This is your secret name, your troop name. We of Sietch Tabr may use it, but none other may so presume . . . Usul."

Murmuring went through the troop: "Good choice, that . . . Strong . . . Bring us luck." And Jessica sensed the acceptance, knowing she was included in it with her champion. She was, indeed, Sayyadina.

"Now, what name of manhood do *you* choose for us to call you openly?" Stilgar asked.

Paul glanced at his mother, back to Stilgar. Bits and pieces of this moment registered on his prescient *memory,* but he felt the differences as though they were physical, a pressure forcing him through the narrow door of the present.

"How do you call among you the little mouse, the mouse that jumps?" Paul asked, remembering the *pop-hop* of motion at Tuono Basin. He illustrated with one hand.

A chuckle sounded through the troop.

"We call that one muad'dib," Stilgar said.

Jessica gasped. It was the name Paul had told her, saying that the Fremen would accept them and call him thus. She felt a sudden fear *of* her son and *for* him.

Paul swallowed. He felt that he played a part already played over a thousand times in his mind . . . yet . . . there were differences. He could see himself perched on a diz-

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zying summit, having experienced much and possessed of a profound store of knowledge, but all around him was abyss.

And again he remembered the vision of fanatic legions following the green and black banner of the Atreides, pillaging and burning across the universe in the name of their prophet Muad'Dib.

That must not happen, he told himself.

"Is that the name you wish, Muad'Dib?" Stilgar asked.

"I am an Atreides," Paul whispered, and then louder: "It's not right that I give up entirely the name my father gave me. Could I be known among you as Paul-Muad'Dib?"

"You are Paul-Muad'Dib," Stilgar said.

And Paul thought: *That was in no vision of mine. I did a different thing.*

But he felt that the abyss remained all around him.

Again a murmuring response went through the troop as man turned to man: "Wisdom with strength . . . Couldn't ask more . . . It's the legend for sure . . . Lisan al-Gaib . . . Lisan al-Gaib . . ."

"I will tell you a thing about your new name," Stilgar said. "The choice pleases us. Muad'Dib is wise in the ways of the desert. Muad'Dib creates his own water. Muad'Dib hides from the sun and travels in the cool night. Muad'Dib is fruitful and multiplies over the land. Muad'Dib we call *instructor-of-boys.* That is a powerful base on which to build your life, Paul-Muad'Dib, who is Usul among us. We welcome you."

Stilgar touched Paul's forehead with one palm, withdrew his hand, embraced Paul and murmured, "Usul."

As Stilgar released him, another member of the troop embraced Paul, repeating his new troop name. And Paul was passed from embrace to embrace through the troop, hearing the voices, the shadings of tone: "Usul . . . Usul . . . Usul." Already, he could place some of them by name. And there was Chani who pressed her cheek against his as she held him and said his name.

Presently, Paul stood again before Stilgar, who said: "Now, you are of the Ichwan Badwine, our brother." His face hardened, and he spoke with command in his voice. "And now, Paul-Muad'Dib, tighten up that stillsuit." He glanced at Chani. "Chani! Paul-Muad'Dib's nose plugs are as poor a fit as I've ever seen! I thought I ordered you to see after him!"

"I hadn't the makings, Stil," she said. "There's Jamis', of course, but . . ."

"Enough of that!"

"Then I'll share one of mine," she said. "I can make do with one until . . ."

"You will not," Stilgar said. "I know there are spares among us. Where are the spares? Are we a troop together or a band of savages?"

Hands reached out from the troop offering hard fibrous objects. Stilgar selected four, handed them to Chani. "Fit these to Usul and the Sayyadina."

A voice lifted from the troop: "What of the water, Stil? What of the literjons in their pack?"

"I know your need, Farok," Stilgar said. He glanced at Jessica. She nodded.

"Broach one for those in need," Stilgar said. "Watermaster . . . where is a watermaster? Ah, Shimoom, care for the measuring. Give what is needed and no more. This water is the dower property of the Sayyadina and will be repaid in sietch at field rates less pack fees."

"What is this repayment at field rates?" Jessica asked.

"Ten for one," Stilgar said.

"But . . ."

"A wise rule as you'll come to see," Stilgar said.

Rustling of robes marked movement at the back of the troop. Men turned to get the water.

Stilgar held up a hand for silence. "As to Jamis," he said, "I order the full ceremony. Jamis was our companion and brother of the Ichwan Badwine. There shall be no turning away without the respect due one who proved our fortune by his *tahaddi*-challenge. I invoke the rite—at sunset when the dark shall cover his going."

Hearing the words, Paul realized he had plunged again into a Time abyss. No fixed future occupied his mind except for a distant sensing of the green and black Atreides banner waving over the bloody swords of his fanatic legions.

I cannot let that happen, he told himself.

But he saw that blind-Time had its own rigors, preparing him for the experience of new lifetimes, for another inflooding of possible futures.

XII

God created Arrakis to train the faithful.
"The Wisdom of Muad'Dib"
by The Princess Irulan

In the stillness of the cavern, Jessica heard the scrape of sand on rock as people moved, the distant bird calls that Stilgar had said were the signals of his watchmen.

The great plastic hood-seals had been removed from the cave's openings. She could see the march of evening shadows across the lip of rock in front of her and the open basin beyond. She sensed the daylight leaving them, sensed it in the dry heat as well as the shadows. She knew her trained awareness soon would give her what these Fremen obviously had—the ability to sense even the slightest change in the air's moisture.

How they had scurried to tighten their stillsuits when the cave was opened!

Deep within the cave, someone began chanting:

"Ima trava okolo!
I korenja okolo!"

Jessica translated silently: *"These are ashes! And these are roots!"*

The funeral ceremony for Jamis was beginning.

She looked out at the Arrakeen sunset, at the banked decks of color in the sky. Night was beginning with its

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mysterious shadows along the distant rocks and the dunes.

Yet the heat persisted.

Heat forced her thoughts onto water and the observed fact that these people could be trained to be thirsty only at given times.

Thirst.

She could remember moonlighted waves on Caladan throwing white robes over rocks . . . and the wind heavy with dampness. Now, the breeze fingered her robes seared the patches of exposed skin at cheeks and forehead. The new nose plugs irritated her, and she found herself overly conscious of the tube that trailed down across her face into the suit, recovering her breath's moisture.

The suit itself was a sweatbox.

"*Your suit will be more comfortable when you've adjusted to a lower water content in your body,*" Stilgar had said.

She knew he was right, but the knowledge made this moment no more comfortable. The unconscious preoccupation with water here weighed on her mind. *No,* she corrected herself: *it was preoccupation with* moisture.

And that was a more subtle and profound matter.

She heard approaching footsteps, turned to see Paul come out of the cave's depths trailed by the elfin-faced Chani.

There's another thing, Jessica thought. *Paul must be cautioned about their women. One of these desert women would not do as wife to a Duke. As concubine, yes, but not as wife.*

Then, she wondered at herself, thinking: *Have I been infected with his schemes?* And she saw how well she had been conditioned. *I can think of the marital needs of royalty without once weighing my own concubinage. Yet . . . I was more than concubine.*

"Mother."

Paul stopped in front of her. Chani stood at his elbow.

"Mother, do you know what they're doing back there?"

Jessica looked at the dark patch of his eyes staring out from the hood. "I think so."

"Chani showed me . . . because I'm supposed to see it and give my . . . permission for the weighing of the water."

Jessica looked at Chani.

"They're recovering Jamis' water," Chani said, and her thin voice came out nasal past the nose plugs. "It's the rule. The flesh belongs to the person, but his water belongs to the Tribe . . . except in combat."

"They say the water's mine," Paul said.

Jessica wondered why this should make her suddenly alert and cautious.

"Combat water belongs to the winner," Chani said. "It's because you have to fight in the open without stillsuits. The winner has to get back the water that he loses while fighting."

"I don't want his water," Paul muttered. He felt that he was a part of many images moving simultaneously in a fragmenting way that was disconcerting to the inner eye. He could not be certain what he would do, but of one thing he was positive: he did not want the water distilled out of Jamis' flesh.

"It's water . . . water," Chani said.

Jessica marveled at the way she said it. "*Water.*" So much meaning in a simple sound. A Bene Gesserit axiom came to Jessica's mind: "*Survival is the ability to swim in strange water.*" And Jessica thought: *Paul and I, we must find the currents and patterns in these strange waters . . . if we're to survive.*

"You will accept the water," Jessica said.

She recognized the tone in her voice. She had used that same tone once with Leto, telling her lost Duke that he would accept a large sum offered for his support in a questionable venture— because money maintained power for the Atreides.

On Arrakis, water was money. She saw that clearly.

Paul remained silent, knowing then that he would do as she ordered—not because she ordered it, but because her tone of voice had forced him to re-evaluate. To refuse the water would break with accepted Fremen practice.

Presently, Paul recalled the words of 467 Kalima in Yueh's OC Bible. He said: "From water does all life begin."

Jessica stared at him. *Where did he learn that quotation?* she asked herself. *He hasn't studied the mysteries.*

"Thus it is spoken," Chani said. "*Giudichar mantene:* It is written in the *Shah-Nama* that water was the first of all things created."

For no reason she could explain—and *this* bothered her more than the sensation—Jessica suddenly shuddered. She turned away to hide her confusion and was just in time to see the sunset. A violent calamity of color spilled over the sky as the sun dipped beneath the horizon.

"It is time!"

The voice was Stilgar's ringing in the cavern. "Jamis' weapon has been killed. Jamis has been called by Him, by Shaihulud, who has ordained the phases for the moons which daily wane and—in the end—appear as bent and withered twigs." Stilgar's voice lowered. "Thus it is with Jamis."

Silence fell like a blanket on the cavern.

Jessica saw the grayshadow movement of Stilgar like a ghost figure within the dark inner reaches. She glanced back at the basin, sensing the coolness.

"The friends of Jamis will approach," Stilgar said.

Men moved behind Jessica, dropping a curtain across the opening. A single glowglobe was lighted overhead far back in the cave. Its yellow glow picked out an inflowing of human figures. Jessica heard the rustling of the robes.

Chani took a step away as though pulled by the light.

Jessica bent close to Paul's ear, speaking in the Family

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code: "Follow their lead; do as they do. It will be a simple ceremony to placate the shade of Jamis."

It will be more than that, Paul thought. And he felt a wrenching sensation within his awareness as though he were trying to grasp some thing-in-motion and render it motionless.

Chani glided back to Jessica's side, took her hand. "Come, Sayyadina. We must sit apart."

Paul watched them move off into the shadows, leaving him alone. He felt abandoned.

The men who had fixed the curtain came up beside him.

"Come, Usul."

He allowed himself to be guided forward, to be pushed into a circle of people being formed around Stilgar, who stood beneath the glowglobe. Beside Stilgar lay a bundled, curving and angular shape gathered beneath a robe on the rock floor.

The troop crouched down at a gesture from Stilgar, their robes hissing with the movement. Paul settled with them, watching Stilgar, noting the way the overhead globe made pits of his eyes and brightened the touch of green fabric at his neck. Paul shifted his attention to the robe-covered mound at Stilgar's feet, recognized the handle of a baliset protruding from the fabric.

"The spirit leaves the body's water when the first moon rises," Stilgar intoned. "Thus it is spoken. When we see the first moon rise this night, who will it summon?"

"Jamis," the troop responded.

Stilgar turned full circle on one heel, passing his gaze across the ring of faces. "I was a friend of Jamis," he said. "When the hawk plane swooped upon us at Hole-In-The-Rock, it was Jamis pulled me to safety."

He bent over the pile beside him, lifted away the robe. "I take this robe as a friend of Jamis—leader's right." He draped the robe over a shoulder, straightening.

Now, Paul saw the contents of the mound exposed: the pale glistening gray stillsuit, a battered literjon, a kerchief with a tiny book on it, the bladeless handle of a crysknife, an empty sheath, folded back, paracompass, distrans, thumper, a pile of fist-sized metallic hooks, a mound of small rocks in a fold of cloth, a bundled clump of feathers . . . and the baliset beside the pack.

So Jamis played the baliset, Paul thought.

The instrument reminded him of Gurney Halleck. This made him think of the many lives he lived in prescience. They felt real . . . he learned from each of them . . . yet . . .

The chance-lines of *the-future-in-the-past,* Paul knew, could reunite him with Gurney. But the shadowed uncertainty factor touched Paul with wonder. He felt for a moment that one decision of his might destroy Gurney and another decision bring the man back to life . . . or . . .

Paul swallowed.

Again, Stilgar bent over the mound.

"For Jamis' woman and for the guards," he said. The small rocks and book were taken into the folds of his robe.

"Leader's right," the troop intoned.

"The marker for Jamis' coffee service," Stilgar said, and lifted a flat green metal disk. "That it shall be given to Usul in suitable ceremony when we return to the sietch."

"Leader's right," chanted the troop.

Lastly, he took the crysknife handle and stood with it. "For the funeral plain," he said.

"For the funeral plain," the troop responded.

At her place across the circle from Paul, Jessica nodded, recognizing the ancient source of the rite. And she thought: *The meeting between ignorance and knowledge, between brutality and culture, begins in the dignity with which we treat our dead.* She stared at Paul, wondering: *Will he see it? Will he know what to do?*

"We are friends of Jamis," Stilgar said. "We are not wailing for our dead like a pack of garvarg."

A gray-bearded man to Paul's left stood up. "I was a friend of Jamis," he said. He crossed to the mound, lifted the distrans. "When our water went below minim at the siege at Two Birds, Jamis shared." The man returned to his place in the circle.

Am I supposed to say I was a friend of Jamis? Paul wondered. *Do they expect me to take something from that pile?* He saw faces turn toward him, turn away. *They do expect it!*

Another man across from Paul arose, went to the pack and removed the paracompass. "I was a friend of Jamis," he said. "When the patrol caught us at Bight-Of-The-Cliff and I was wounded, Jamis drew them off so the wounded could be saved." He returned to his place in the circle.

Again, the faces turned toward Paul, and he saw the expectancy in them, lowered his eyes. An elbow nudged him and a voice hissed: "Would you bring the destruction on us?"

How can I say I was his friend? Paul wondered.

Another figure arose from the circle opposite Paul and, as the hooded face came into the light, he recognized his mother. She removed a kerchief from the mound. "I was a friend of Jamis," she said. "When the spirit of spirits within him saw the needs of truth, that spirit withdrew and spared my son." She returned to her place.

And Paul recalled the scorn in his mother's voice as she had confronted him after the fight. *"How does it feel to be a killer?"*

Again, he saw the faces turned toward him, felt the anger and fear in the troop. A passage his mother had once filmbooked for him on "The Cult of the Dead" flickered through Paul's mind. He knew what he had to do.

Slowly, Paul got to his feet.

A sigh passed around the circle.

Paul felt the diminishment of his *self* as he advanced into the center of the circle. It was as though he had lost a fragment of himself and sought it here. He bent over

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the mound of belongings, lifted out the baliset. A string twanged softly as it struck against something in the pile.

"I was a friend of Jamis," Paul whispered.

He felt tears burning his eyes, forced more volume into his voice. "Jamis taught me . . . that . . . when you kill . . . you pay for it. I wish I'd known Jamis better."

Blindly, he groped his way back to his place in the circle, sank to the rock floor.

A voice hissed: "He sheds tears!"

It was taken up around the ring: "Usul gives moisture to the dead!"

He felt fingers touch his damp cheek, heard the awed whispers.

Jessica, hearing the voices, felt the depth of the experience, realized what terrible inhibitions there must be against shedding tears. She focused on the words: "*He gives moisture to the dead.*" It was a gift to the shadow world—tears. They would be sacred beyond a doubt.

Nothing on this planet had so forcefully hammered into her the ultimate value of water. Not the water sellers, not the dried skins of the natives, not stillsuits nor the rules of the water discipline. Here there was a substance more precious than all others—it was Life itself and entwined all around with symbolism and ritual.

Water.

"I touched his cheek," someone whispered. "I felt the gift."

At first the fingers touching his face frightened Paul. He clutched the cold handle of the baliset, feeling the strings bite his palm. Then he saw the faces beyond the groping hands—the eyes wide and wondering.

Presently, the hands withdrew. The funeral ceremony resumed. But now there was a subtle space around Paul, a drawing back as the troop honored him by a respectful isolation.

The ceremony ended with a low chant:

"Full moon calls thee—
Shai-hulud shalt thou see;
Red the night, dusky sky,
Bloody death didst thou die.
We pray to the moon: she is round—
Luck with us will then abound,
What we seek for shall be found
In the land of solid ground."

A bulging sack remained at Stilgar's feet. He crouched, placed his palms against it. Someone came up beside him, crouched at his elbow, and Paul recognized Chani's face in the hood shadow.

"Jamis carried thirty-three liters and seven and three-thirty-seconds drachms of the Tribe's water," Chani said. "I bless it now in the presence of a Sayyadina. *Ekkeri-akairi,* this is the water; *fillissin-follasy* of Paul-Muad' Dib! *Kivi a-kavi,* never the more . . . *Nakelas! Nakalas!* to be measured and counted—*ukair-an!* by the heartbeats *jan-jan-jan* of our friend . . . Jamis."

In an abrupt and profound silence, Chani turned, stared at Paul. Presently, she said: "Where I am flame be thou the coals. Where I am rain be thou the water."

"Bi-lal kaifa," intoned the troop.

"To Paul-Muad'Dib goes this portion," Chani said. "May he guard it for the Tribe, preserving it against careless loss. May he be generous with it in time of need. May he pass it on in his time for the good of the Tribe."

"Bi-lal kaifa," intoned the troop.

I must accept that water, Paul thought. Slowly, he arose, made his way to Chani's side. Stilgar stepped back to make room for him, took the baliset gently from his hand.

"Kneel," Chani said.

Paul knelt.

She guided his hands to the waterbag, held them against the resilient surface. "With this water the Tribe entrusts thee," she said. "Jamis is gone from it. Take it in peace." She stood, pulling Paul up with her.

Stilgar returned the baliset, extended a small pile of metal rings in one palm. Paul looked at them, seeing the different sizes, the way the light of the glowglobe reflected off them.

Chani took the largest ring, held it on a finger. "Thirty liters," she said. One by one, she took the others, showing each to Paul, counting them. "Two liters; one liter; seven watercounters of one drachm each; one watercounter of three thirty-seconds drachms. In all—thirty-three liters and seven and three-thirty-seconds drachms."

She held them up on her finger for Paul to see.

"Do you accept them?" Stilgar said.

Paul swallowed, nodded. "Yes."

"Later," Chani said, "I will show you how to tie them in a kerchief so they won't rattle and give you away when you need silence." She extended her hand.

"Will you . . . hold them for me?" Paul asked.

Chani turned a startled glance on Stilgar.

He smiled, said: "Paul-Muad'Dib who is Usul does not yet know our ways, Chani. Hold his watercounters without commitment until it's time to show him the manner of carrying them."

She nodded, whipped a ribbon of cloth from beneath her robe, linked the rings onto it with an intricate over and under weaving, hesitated, then stuffed them into the sash beneath her robe.

I missed something there, Paul thought. He sensed the feeling of humor around him, something bantering in it, and his mind linked up a prescient memory: *watercounters offered to a woman—courtship ritual.*

"Watermasters," Stilgar said.

The troop arose in a hissing of robes. Two men stepped out, lifted the waterbag. Stilgar took down the glowglobe, led the way with it into the depths of the cave.

Paul was pressed in behind Chani, noted the buttery glow of light over rock walls, the way the shadows danced, and he felt the troop's lift of spirits contained in a hushed air of expectancy.

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Jessica, pulled into the end of the troop by eager hands, hemmed around by jostling bodies, suppressed a moment of panic. She had recognized fragments of the ritual, identified the shards of Chakobsa and Bhotani-jib in the words, and she knew the wild violence that could explode out of these seemingly simple moments.

Jan-jan-jan, she thought. *Go-go-go.*

It was like a child's game that had lost all inhibition in adult hands.

Stilgar stopped at a yellow rock wall. He pressed an outcropping and the wall swung silently away from him, opening along an irregular crack. He led the way through past a dark honeycomb lattice that directed a cool wash of air across Paul when he passed it.

Paul turned a questioning stare on Chani, tugged her arm. "That air felt damp," he said.

"*Shhhh,*" she whispered.

But a man behind them said: "Plenty of moisture in the trap tonight. Jamis' way of telling us he's satisfied."

Jessica passed through the secret door, heard it close behind. She saw how the Fremen slowed while passing the honeycomb lattice, felt the dampness of the air as she came opposite it.

Windtrap! she thought. *They've a concealed windtrap somewhere on the surface to funnel air down here into cooler regions and precipitate the moisture from it.*

They passed through another rock door with lattice work above it, and the door closed behind them. The draft of air at their backs carried a sensation of moisture clearly perceptible to both Jessica and Paul.

At the head of the troop, the glowglobe in Stilgar's hands dropped below the level of the heads in front of Paul. Presently, he felt steps beneath his feet, curving down to the left. Light reflected back up across hooded heads and a winding movement of people spiraling down the steps.

Jessica sensed mounting tension in the people around her, a pressure of silence that rasped her nerves with its urgency.

The steps ended and the troop passed through another low door. The light of the glowglobe was swallowed in a great open space with a high curved ceiling.

Paul felt Chani's hand on his arm, heard a faint dripping sound in the chill air, felt an utter stillness come over the Fremen in the cathedral presence of water.

I have seen this place in many dreams, he thought.

The thought was both reassuring and frustrating. Somewhere ahead of him on this path, the fanatic hordes cut their gory path across the universe in his name. The green and black Atreides banner would become a symbol of terror. Wild legions would charge into battle screaming their warcry: "Muad'Dib!"

It must not be, he thought. *I cannot let it happen.*

But he could feel the demanding Race Consciousness within him, his own Terrible Purpose, and he knew that no small thing could deflect the juggernaut. It was gathering weight and momentum. He knew that if he died this instant, the thing would go on through his mother and his unborn sister. Nothing less than the deaths of all the troop gathered here and now—himself and his mother included—could stop the thing.

Paul stared around him, saw the troop spread out in a line. They pressed him forward against a low barrier carved from native rock. Beyond the barrier in the glow of Stilgar's globe, Paul saw an unruffled dark surface of water. It stretched away into shadows—deep and black—the far wall only faintly visible, perhaps a hundred meters away.

Jessica felt the dry pulling of skin on her cheeks and forehead relaxing in the presence of moisture. The water pool was deep; she could sense its deepness, and resisted a desire to dip her hands into it.

A splashing sounded on her left. She looked down the shadowy line of Fremen, saw Stilgar with Paul standing beside him and the watermasters emptying their load into the pool through a flowmeter. The meter was a round gray eye above the pool's rim. She saw its glowing pointer move as the water flowed through it, saw the pointer stop at thirty-three liters, seven and three-thirty seconds drachms.

Superb accuracy in water measurement, Jessica thought. And she noted that the walls of the meter trough held no trace of moisture after the water's passage. The water flowed off those walls without binding tension. She saw a profound clue to Fremen technology in the simple fact: they were perfectionists.

Jessica worked her way down the barrier to Stilgar's side. Way was made for her with casual courtesy. She noted the withdrawn look in Paul's eyes, but the mystery of this great pool of water dominated her thoughts.

Stilgar looked at her. "There were those among us in need of water," he said, "yet they would come here and not touch this water. Do you know that?"

"I believe it," she said.

He looked at the pool. "We have more than thirty-eight million decaliters here," he said. "Walled off from the Little Makers, hidden and preserved."

"A treasure trove," she said.

Stilgar lifted the globe to look into her eyes. "It is greater than treasure. We have thousands of such caches. Only a few of us know them all." He cocked his head to one side. The globe cast a yellow-shadowed glow across face and beard. "Hear that?"

They listened.

The dripping of water precipitated from the windtrap filled the room with its presence. Jessica saw that the entire troop was caught up in a rapture of listening. Only Paul seemed to stand remote from it.

To Paul, the sound was like moments ticking away. He could feel Time flowing through him, the instants never to be recaptured. He sensed a need for decision, but felt powerless to move.

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"It has been calculated with precision," Stilgar whispered. "We know to within a million decaliters how much we need. When we have it, we shall change the face of Arrakis."

A hushed whisper of response lifted from the troop: "Bi-lal kaifa."

"We will trap the dunes beneath grass plantings," Stilgar said, his voice growing stronger. "We will tie the water into the soil with trees and undergrowth."

"Bi-lal kaifa," intoned the troop.

"Each year the polar ice retreats," Stilgar said.

"Bi-lal kaifa," they chanted.

"We shall make a homeworld of Arrakis—with melting lenses at the poles, with lakes in the temperate zones, and only the deep desert for the Maker and His spice."

"Bi-lal kaifa."

"And no man ever again shall want for water. It shall be his for dipping from well or pond or lake or canal. It shall be there for any man to take. It shall be his for holding out his hand."

"Bi-lal kaifa."

Jessica felt the religious ritual in the words, noted her own instinctively awed response. *They're in league with the future,* she thought. *They have their mountain to climb. This is the scientist's dream . . . and these simple people, these peasants, are filled with it.*

Her thoughts turned to Liet-Kynes, the Emperor's planetary ecologist, the man who had gone native—and she wondered at him. This was a dream to capture men's souls, and she could sense the hand of the ecologist in it. This was a dream for which men would die willingly. It was another of the essential ingredients that she felt her son needed: people with a goal. Such people would be easy to imbue with fervor and fanaticism. They could be wielded like a sword to win back Paul's place for him.

"We leave now," Stilgar said, "and wait for the first moon's rising. When Jamis is safely on his way, we shall go home."

Whispering their reluctance, the troop fell in behind him, turned back along the water barrier and up the stairs.

Paul, walking beside Chani, felt that a vital moment had passed him, that he had missed an essential decision and was now caught up in his own myth. He knew he had seen this place once in a prescient dream on far away Caladan. But fragmented details of the place were being filled in now. He felt wonder at his gift. It was as though he rode within Time's wave, now in its trough, now on its crest—and all around him the other waves lifted and fell, revealing and concealing. And the experiences of the possible futures poured through him, enriching him, aging his atman-self millennia per second.

Still, like a promontory above the surf, the wild *jihad* loomed on his Time horizon full of violence and slaughter.

The troop filed through the last door into the main cavern. The door was sealed. Lights were extinguished, hoods taken from the cavern openings. And they saw that night with its blanket of stars had come over the desert.

Jessica moved to the lip of the cavern, looked up at the stars—so sharp and near they were. She felt the troop stir, heard a baliset being tuned—Paul's voice humming the pitch. There was melancholy in the sound and it rasped her nerves.

Chani's voice intruded from the deep cavern darkness: "Tell me about the waters of your birthworld. Paul-Muad'Dib."

And Paul: "Another time, Chani. I promise."

Such sadness!

"It's a good baliset," Chani said.

"Very good," Paul said. "Do you think Jamis will mind my using it?"

He speaks of the dead in the present tense, Jessica thought. The implications disturbed her.

A man's voice intruded: "He liked music betimes, Jamis did."

"Then sing me one of your songs," Chani pleaded.

Such feminine allure in that girlchild's voice, Jessica thought. *I must caution Paul about their women . . . and soon.*

"This was a song of a friend of mine—Gurney." Paul said. "I expect he's dead now. He called it his even-song."

The troop grew still, listening as Paul's voice lifted in a sweet boy tenor with the baliset tinkling and strumming beneath it:

"This clear time of seeing embers—
A gold-bright sun's lost in first dusk.
What frenzied senses, desp'rate musk
Are consort of rememb'ring."

Jessica felt the verbal music in her breast—pagan and charged with sounds that made her suddenly and intensely aware of herself, feeling her own body and its needs. She listened with a tense stillness.

"Night's pearl-censered requi-em . . .
'Tis for us!
What joys run, then—
Bright in your eyes—
What flower-spangled amores
Pull at our hearts . . .
What flower-spangled amores
Fill our desires."

And Jessica heard the after-stillness that hummed in the air with the last note. *Why does my son sing a love-song to that girlchild?* she asked herself. She felt an abrupt fear. She could sense life flowing around her and she had no grasp on its reins. *Why did he choose that song?* she wondered. *The instincts are true sometimes. Why did he do this?*

Paul sat silently in the darkness, a single stark thought dominating his awareness: *My mother is my enemy. She does not know it, but she is. She is bringing the jihad. She bore me; she trained me. She is my enemy.*

To be continued

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PROGRAM FOR LUNAR LANDINGS *continued from page 16*

our goals concerning lunar exploration would be re-evaluated. This possibility is not considered to be very likely, but its ramifications are so important that it must not be overlooked.

(2) The surface is found landable, and there are no important reasons for canceling or changing Apollo. In this case, the landing will be attempted as soon as possible. This could be any time between 1969 and 1973. This is regarded as the likeliest possibility.

Several manned landings will be made on the moon by the Saturn 5/Apollo. Follow-on missions depend very much upon what is found during these early manned landings. At this point—which will be between 1970 and 1973—the following alternate possibilities may exist:

1) The moon is barren and useless, even as a subject of scientific study.
2) The moon is relatively useless as far as its composition, environment, and characteristics are concerned, but is a worthwhile subject for scientific study or other endeavors.
3) The moon is an extremely interesting object and warrants extensive investigation at the expense of other programs.

The first and third possibilities, by their extreme natures, are least probable, but their ramifications should be examined. If the first happens, infrequent Apollo missions will be the most that will be done to explore the moon until 1980 at least. Regarding the third, the picture is altogether different. An entirely new lunar transportation system will be evolved to support an extensive lunar base program. Before saying more about this, however, we will go back and examine the second—and most probable—alternative.

We assume that after the first five Apollo landings or so, a small base will be established. This, in turn, automatically assumes an established system of supply, depending upon the size of the base and number of crew members, as well as functions. A still further assumption is that the lunar base will be strictly scientific, and like our Antarctic bases, will evolve slowly, while still pursuing a program that will eventually develop into an important activity of the space program.

So, with or without logistics support, we can expect to perform five to seven Apollo missions during the first half of the 1970s. Ultimately, a transition will have to be made to an established lunar base. If we assume that the first permanent base will be fairly small—four to ten men—and whose main purpose is exploration in the general vicinity of the base site, we can begin to gather together what will be needed. The length of mission time on the moon will be increased during the last few Apollo missions, accomplished by improving Apollo performance—for example, using cryogenic propellants in LEM in conjunction with more efficient engines—and/or providing logistics support by dumping supplies in the landing area, again using unmanned LEM's. Apollo missions may involve stays up to a month on the lunar surface. Several such missions, particularly if they overlap, could represent the beginnings of the lunar base.

To expand this rough beginning, housing for the crew and equipment, base structure and major systems will have to be ferried to the base site. Secondly, this base and its crew must be resupplied periodically. A five-man crew will require about 25,000 pounds per year. Third, the base personnel must be rotated at reasonable intervals.

A base this small is within the scope, both logistically and cost-wise, of an uprated Saturn 5/Apollo system. For resupply purposes, unmanned LEM vehicles, crammed to capacity can be landed near the base site. Fresh personnel can be brought in in manned LEM's. This allows a gradual and logical evolution of Apollo into an early Lunar Transportation System.

It is becoming more and more doubtful whether the NOVA concept which could permit direct earth-lunar landings will ever see the hardware stage. Assuming a go-ahead of 1968, it is estimated that NOVA could not be ready to fly until the mid or late 1970s, thus slowing down the expansion of the lunar base. The cost and actual need for a 1,000,000 payload capability booster seems more and more remote. Industry is already pushing the small—up to ten tons—and medium—up to fifty tons in earth orbit—recoverable booster. The deciding factor may well be the manned orbiting space-station systems which will need to be re-supplied at reasonable intervals with rotating crew members as well as logistics. In support of this recoverable booster concept, the manned lunar base will also need to be resupplied at intervals not exceeding three months. If an efficient recoverable booster system is established to support the manned space station program, it can readily be adapted to provide support for the advanced lunar base. Lunar base operations, such as thorough exploration and the various scientific projects that will be eagerly programmed, cannot begin in earnest until large quantities of cargo and personnel can be brought to and from the moon at little more than three-month intervals and be brought in cheaply and with small risk to untrained scientific personnel.

If we continue the assumption that the first permanent four- to ten-man lunar base will develop from Apollo landings somewhere in the time period 1973 to 1975, a working, efficient shuttle system beyond Saturn 5/Apollo must be ready if we are to proceed with enlarging the lunar base.

Stage One—Earth to Orbit

An integral part of the Lunar Transportation System then will be the Earth to Orbit shuttle system which will already be in operation to supply

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large Earth orbiting manned space stations. Beginning in 1967-68, the first of the small experimental space stations will be launched into orbit. They will be small four- to ten-man stations composed of up-rated Gemini or Apollo modules with larger support and living quarter modules attached. Their resupply problems throughout their relatively short lifetimes can easily be taken care of by the current crop of medium boosters, Saturn 1B, Titan 3A or 3C.

By the turn of the '70s larger eighteen- to thirty-man space stations will be in orbit. The actual shape and type of these space stations need not concern us here. What must be considered is, that, by 1980, there will have been as many as four large space stations—two of which will operate concurrently toward the end of the '70s. Their expected lifetimes will be set at three to five years to begin and increased as techniques become more flexible, complicating resupply problems severely.

In addition our Lunar Base will be undergoing the transition from temporary, long stay Apollo missions to a permanent manned base. In effect, as the Space stations grow, so will the Lunar Base; not because of any direct connection, but because both projects will have reached Mr. Robert Heinlein's "time to railroad" stage.

With Congress and the public becoming increasingly cost conscious concerning new space projects, economy will be the key word in both. By Fiscal Year 1975, if current trends continue, we can expect the total space budget—NASA, DOD, and AEC—to be close to 10.4 billion dollars. To prevent launch costs from eating up too large a portion of this budget, the recoverable booster will be a necessity.

There are several concepts now being studied in many large Aerospace firms and by NASA and DOD. They range from studies to recover current boosters to completely new concepts such as NASA's rocket-sled launched booster and the Air Force Aerospace plane. The recoverable booster system most envisioned is a horizontal take-off and landing two-stage vehicle with an aircraft mode of operation. It will in all probability be powered by five high pressure liquid O_2/H_2 rocket engines with two advanced 30,000 pound thrust non-afterburning fan jet engines. The jet engines will allow the pilot not only to reach supersonic speeds without burning excessive rocket fuel in takeoff but will allow the pilot to land under power and also provide an abort capability if needed.

The rocket engines will ignite after supersonic speed is attained and accelerate the vehicle to Mach 8 and 120,000 feet. At this point the second stage, which may be either a non-recoverable cargo stage or a recoverable glider-reentry vehicle will separate and burn its high pressure liquid O_2/H_2 engine to attain orbit.

The first stage will then execute a sweeping turn, glider fashion, to reduce speed and return to base under fan jet power.

The atmospheric maneuvering ability of this vehicle is extremely valuable in placing the payload into a variety of orbits from a number of locations. Another advantage lies in the fact that the recoverable booster of this type can operate from existing SAC bases or commercial jet ports.

Several designs call for payloads ranging anywhere from 7,000 to 60,000 to 100,000 pounds in 100 nm Earth orbit.

Without a doubt, the development of an entirely new booster will be a costly proposition. But, even more costly by 1980, would be the continued use of conventional non-recoverable boosters.

It is quite apparent that the outrageous costs for boosting spacecraft into orbit must decrease for the space program to be economically feasible. Some cost reductions are already being achieved through technology advances, standardization, improved launch procedures, and by increased size of launch vehicles. We are, however, rapidly reaching the point of diminishing returns with expendable launch vehicles and the recoverable booster is looming closer and closer as the only answer.

Recoverable vehicles will not pick up in payload weights where expendable vehicles leave off. That is they will not carry larger payloads say, than Saturn 5, but will start with a fairly small, first-generation vehicle requiring less development effort and expense and capable of carrying ten to twenty tons into low orbit. This first-generation vehicle will serve to supply the large manned space stations of the early '70s. They will be capable of a high number of launches per year, as many as two to three per month, or more if needed. They still will be fairly expensive to develop—1 billion dollars is estimated for the first generation and 3 billion for the second generation—but this cost will be recaptured easily in the expected savings by 1980.

It has been estimated that launch costs by 1980 will run a cool, cumulative 15-18 billion dollars. The recoverable boosters will be able to realize a savings approaching 8 billion out of which the initial 4 billion development cost must be subtracted, leaving still, 4 billion dollars in savings.

The first-generation recoverable booster will phase into the booster picture about 1970. The larger second-generation booster by 1975 and will serve the large manned space stations and the developing Lunar Base. After 1980, the savings in launch costs will rise dramatically as the development costs are paid off.

Since recoverable boosters are under such intensive study, and since the need for them is so apparent to NASA and DOD, these dates are not unrealistic. The two projects which will certainly receive high priority in the 1970s, the manned space stations and the Lunar Base will of necessity, create a strong requirement. Towards the end of the 1970s, the Mars Expedition that will begin assembling in Earth orbit will add incentive.

Stage Two—Orbit to Orbit

In stage two of the Lunar Transportation System the expendable Earth-Orbit to Lunar-Orbit craft is the simplest approach. It involves the lowest

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number of changes in the programmed Apollo missions, technology, and hardware as well as the lowest weight in earth orbit for a given payload in lunar orbit.

Let's break the system down further. The simplest version would consist of five vehicles—Saturn 5 for the initial launch or two, an "in-space" boost stage for the Earth-Orbit to Lunar-Orbit shuttle, the Service module for the return shuttle portion, the Apollo Command module, and the LEM vehicle.

When we program a Lunar Transportation System in which personnel are returned to earth orbit rather than directly to earth we ask for a serious weight penalty on the overall system regarding the retro-propulsion required to enter earth orbit. On the other hand, it will allow us to integrate the Lunar Transportation System with the manned space station program and carry untrained personnel to the Lunar surface. Atmospheric braking of the Orbit-to-Orbit shuttle as it enters earth orbit on the return trip has been suggested, but the high weight penalties associated with heat shielding would make it impracticable at this stage.

If we develop this semi-reusable system, which naturally would cut costs and equipment needed to the minimum, we can, without extensive changes in the Lunar launching mission state-of-the art, use the basic Apollo Lunar System for a Lunar Transportation System, Figure 9.

The Apollo Command module will be enlarged and modified and mounted as the Command Module for the Orbit-to-Orbit shuttle. The Service Module will be enlarged and provided with inexpensive, fabric, or thin metal "drop" tanks for the orbit-to-orbit and return portion of the shuttle. The Saturn 5 must lift this first Apollo system into earth orbit where it will be modified for orbit-to-orbit work. So we now have in earth orbit, an Apollo Command Module, a greatly enlarged Service Module—mostly oversize fuel tanks—and the LEM vehicle. The first shuttle trip will bring little cargo to the moon but will establish the system.

Personnel and cargo will be carried into earth orbit in recoverable boosters. Heavy cargoes and fuel for the Service Module and the Lunar based LEM can be launched using any of three vehicles, Titan IIIC, Saturn 1B or Saturn 5. However, if the recoverable booster is available, Saturn 1B will not be used unless the recoverable booster is small in payload capacity, ten tons or less. Titan IIIC, unless uprated with 260-inch solid strap-on boosters and/or a more powerful transtage in which case it would become a candidate, has a payload capacity of only 25,000 pounds in 100 n.m. orbit coupled with a relatively small volume of cargo space as against 34,000 pounds for Saturn 1B and large cargo hold and 250,000 pounds for Saturn 5.

We can assume that the recoverable boosters will then handle personnel and light cargoes and Saturn 5 heavy cargoes and fuel for the two vehicles, Service module and LEM.

Stage Three—Lunar Orbit to Surface

The LEM vehicle, uprated by using higher energy, possibly cryogenic fuels, would depart from lunar orbit to the lunar surface with its complement of passengers. On its return to lunar orbit and rendezvous with the shuttle, LEM would carry rotated personnel and small amounts of cargo. The shuttle, leaving LEM in lunar orbit, would then depart for earth orbit using the Service module for power. From earth orbit, the personnel aboard would re-enter via the glider re-entry second-stage vehicle of the recoverable booster system which supplies the large manned space station already in orbit by this mid-1970 period.

This lunar transportation system will carry only personnel to and from the lunar base. Cargo will be carried in a separate logistics system—a one-way unmanned shuttle vehicle which might utilize a larger cargo carrying LEM truck for lunar orbit to lunar surface.

To cut down costs somewhat, and to increase the cargo carrying capacity of the orbit-to-orbit shuttle, the LEM vehicle could be uprated with high energy fuels and a re-usable rocket engine that would allow it to base on the moon, or in lunar orbit. The orbit-to-orbit shuttle could carry fuel to the LEM which would then transfer cargo and/or personnel to the lunar surface. This would allow the shuttle system to carry the equivalent of the LEM's weight minus fuel.

LEM will be an important adjunct of the Lunar Base. Not only will it form stage-three of the Lunar Transportation System, but it will be used by the base personnel for fairly long-range exploration projects and in emergencies as a rescue or supply-drop vehicle for exploration parties traveling on foot or in lunar reconnaissance trucks.

This will mean two things to the Lunar Transportation system. First of all, the basic LEM vehicle with its limited 1,500 pound payload and non-reusable engines will be less than adequate. NASA and several industries, however, are already studying new engines for LEM and it is safe to assume that by the time LEM is ready to phase into even the early Lunar Base, its engines will be capable of performing the assigned missions.

Several proposals and studies have already been put forward to up-rate LEM for a cargo-carrying vehicle. Its payload and cargo space will be enlarged to more than double its present load. LEM is currently designed to carry two men—the two astronauts who will first land on the moon. But, LEM must be capable of carrying more than two men; the pilot and two to five rotating personnel. LEM, in its present configuration is capable of carrying three astronauts in a "stripped" condition, so uprating is still a necessity.

It is very likely that two types of LEM's will have to base on the moon—one for strictly cargo, with or without a pilot, and one for personnel. If two

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LEM's must be devoted to the transportation system, at least one back up vehicle must be on hand for rescue and exploration. In the interests of safety, two back-up vehicles will probably be used; one for instances where the other is needed for exploration or is down for repairs.

This adds still another complication. Fuel for the four LEM's must be brought in from earth, with all of its attendant costs. It may require as many as two extra trips per month by the Orbit-to-Orbit ferry to keep the four vehicles in fuel. Direct launches from earth using the Saturn 5 could handle these extra trips, but the costs will still be exorbitant—500 dollars per pound or more in the 90,000 to 130,000 pound escape payload capacity of the Saturn 5, not to mention attendant launch and expendable vehicle costs. For the first year or two, perhaps these costs might be borne, but as the intensity of exploration, as the base expands, and more personnel arrive with added shuttle trips, the costs will become just plain ridiculous.

There may be a way around this complicating factor that will bite millions every month out of our grudgingly allowed budget. The surface of the moon may provide the necessary fuels.

First of all, advanced LEM's may use liquid oxygen and hydrogen. In fact it is a very good possibility. In fact, they will if the moon proves to be a source of the two elements. All indications, particularly from an analysis of information gathered from Ranger 7's spectacular success, suggest some current volcanic activity on the moon and a great deal in its past. Volcanic rock is high in water content —some varieties as much as five per cent.

Now, obtaining water from Lunar rock is certainly nothing new to science-fiction readers and writers. Even the processes are fairly well understood. Rock is crushed and heated to drive out the water vapor. The water vapor thus obtained is condensed—shadows on the sun-lit moon provide excellent cold traps—into liquid water which is then broken down by electrolysis into its component elements, two atoms of hydrogen for every atom of water. We now have gaseous oxygen and hydrogen. It remains no great feat to compress both to liquids.

The question remains though, how much water can be obtained from the Lunar surface.

The water content of rocks varies quite widely. Some may contain less than a tenth of a per cent, others as much as ten per cent. Most stony meteorites contain less than 1/10 of one per cent—with the notable exception of the carbonaceous chondrites which are ten per cent water by volume. Volcanic rock varies from one to five per cent. So, if the rock on the lunar surface is derived predominantly from meteoric infall, extraction might prove very difficult: a ton of rock would have to be worked to obtain four to six ounces of water. But, if the lunar surface is volcanic in origin, or predominantly so, as crater alignments, crater morphology, and regional tectonics suggest, each cubic foot of rock might yield as high as one gallon of water!

If a gallon of water can be had from each cubic foot, rock could be processed during the 336-hour Lunar day utilizing solar power exclusively, thus preventing a drain on the Lunar Base power supply.

Tests have already shown that simple plastic fresnel lens focused on an enclosed heating chamber to trap the vapor can produce sufficient heat—as high as 700°C—through the thick atmospheric blanket of earth to drive water out of common pitchstone.

Hopefully, water, and thus fuel for the LEM's will not be a problem toward the later 1970s. It might even prove possible, should enough water prove extractable with more advanced methods, to provide fuel for the Orbit-to-Orbit shuttle's return trip, cutting costs and increasing payloads even more.

Using the lunar shuttle system just described, this first advanced lunar base can be maintained with six to eight launches per year. Two of these would be purely cargo carrying, the remaining devoted to passengers. An uprated Saturn 5/S4B booster could handle the increased 110,000 to 120,000 pound payload in lunar orbit.

So, in this 1973 to 1980 period when the Lunar Base is undergoing its transition from manned landing and overlapping missions to a medium size base with an established scientific program, this expendable to semi-nonexpendable Saturn 5 launched lunar transportation system may prove to be the most economically feasible system. It will undergo a transition over eight to ten years from an expendable, non-reusable system to semi-reusable system as traffic increases. The Saturn 5 booster will remain expendable. The "in-space" booster system will become semi-nonexpendable by returning the main portion of the Service module and adding new fuel tanks for each mission. By substituting higher energy propellants and reusable motors in LEM, this vehicle will become reusable and base on the moon or in lunar orbit. This adds still another possibility. It is not farfetched to consider the possibility of a manned orbiting space station in lunar orbit. This particular space station would not have to be as large nor as complete as the space station(s) that will be in earth orbit by this time, and it could serve a variety of purposes besides that of a lunar depot.

By the time the lunar base has grown to accommodate sufficient staff members to begin intensive exploration—sometime in the 1976 to 1980 time period—traffic to and from the lunar base will become fairly heavy, perhaps on the order of one re-supply vehicle every two weeks or more. As exploration and scientific parties spread out across the lunar surface, they will have to stay in communication with the lunar base since radio waves will not bend over the horizon, because of lack of an ionosphere, and radio communications will be limited to line-of-sight.

The lunar orbiting station would serve an ideal purpose as a mobile command post and communications clearing house. In addition, the orbiting space station would have ample opportunity to make cartographic studies of the moon, particularly the

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hidden side. Another advantage of the lunar space station will be to allow us to keep an eye on our competition which will surely establish lunar bases during this time. It is unlikely that this lunar space station will grow past a five- to ten-man crew and it will merely serve this interim period between the establishment of a medium sized lunar base and the institution of a more direct and inexpensive earth orbit to lunar surface shuttle system.

Therefore, our lunar base and logistics supply system summarizes as follows:

1) 1969-1970 First manned lunar landing. Two-man crew, four-hour stay. First generation Recoverable boosters phase in.
2) 1970-1973 Five to seven manned lunar landings with stays extending to one to two months duration. The latter missions may overlap, laying the foundations for the permanent Lunar Base.
3) 1973-1977 The establishment of the permanent manned lunar base with a four- to ten-man crew to begin. During this time period a logical evolution of the Saturn 5/Apollo system into a Lunar Transportation System will take place. Second generation Recoverable boosters begin to phase in.
4) 1975 to 1980 The Lunar Base will gradually grow to a medium size research station with thirty to eighty personnel. The Earth orbit to Lunar orbit shuttle will be in operation towards the latter part of this five-year period.
5) 1975-1980 The Lunar orbiting space station will become operational.

As the decade turns into the 1980s chances are very good that a heavy reusable booster system will be in operation—it will be needed for advanced space station operations—and the orbit-to-orbit shuttle portion of the journey will become a permanent "in-space" shuttle vehicle.

Consideration

In any space program conducted by the United States these three items must be taken into consideration: Public Opinion, Politics, and Economics. It is well to remember that the majority of public opinion concerning the space program ranges from indifference to outright hostility. Adverse opinions, including eminent scientists and statesmen, see any type of civilian space program as a vast boondoggle—another instance of a too strongly centralized federal government throwing away billions of tax dollars. Granted this opinion is at one extreme end of the adverse spectrum, but at the other end is the "if God meant us to fly, he would have given us wings" crew. In between are various shades, indifference; too much, too soon; and it's nice, but so what? A good many politicians, and naturally those from have-not states and the out-party, are fixing their political stands against the space program. Some go as far as to call it a useless waste of money better spent elsewhere, others say merely that we are moving too fast.

In any event, the Democratic party seems to have established itself as the Space party and is going ahead with an intensive space exploration program. They are making the civilian space program and the lunar landing a political issue, albeit a minor one and are equating it with our general defense posture. However, it has become an issue and it has become an integral part of our national economy. Although federal space funding has risen since 1960, total aerospace funding, which includes aircraft, missiles, and space, rose only a slight per cent of the federal budget in 1960 to 1965 —17% to 19%.

In other words, although defense funding has slacked off since 1960, the civilian space program has more than taken up the slack. The space program has established itself as an important, and sizable part of our economy. The federal budget for Fiscal Year 1964, $97.7 billion breaks down like this: The federal budget itself accounts for about 16% of the gross national product. Defense spending accounted for 52% of the federal budget in 1964 while NASA was allocated 5.2%. The total United States Space program amounted to about 7 billion dollars in fiscal year 1964—4% of the DOD budget, 100% of the NASA budget, and 7% of the AEC budget of 2.9% for fiscal year 1964—for a total of 1.1% of the gross national budget.

Space is big business in the U.S. and will become even bigger as years go by. By the time the 1970s roll around there will be three major projects underway, the Manned Space Station, the Lunar Base and the Manned Mars Exploration Project scheduled for the mid-1980s.

Each of these projects will be expensive and major undertakings, although well within our means. If these three programs can be overlapped and mutual technologies be developed, so much the better. Results will rise, costs go down. Therefore, the space station earth to orbit shuttle could also be used to lift Luna bound cargoes into earth orbit for the Orbit-to-Orbit Shuttle and also to supply the Mars Expedition construction complex assembled in earth orbit. Much medical and technological information gleaned from the Space Station and Lunar Base can also be applied to the Mars Project, weightlessness, in-space communications, psychological and logistics information et cetera will all contribute.

As things stand presently, these three projects are deep in planning stages, and various phases in hardware. No one project will be of overriding importance and no one or all three are guaranteed of complete success, much less completion-period.

As long as the three factors, public opinion, politics, and economics are in favor of these projects, we will build terminals in space, a base on the moon, and explore the planets of our solar system and beyond.

In this context our Lunar Mission Spacecraft assume their rightful roles —that of minor, but very important, cogs in future history. ■

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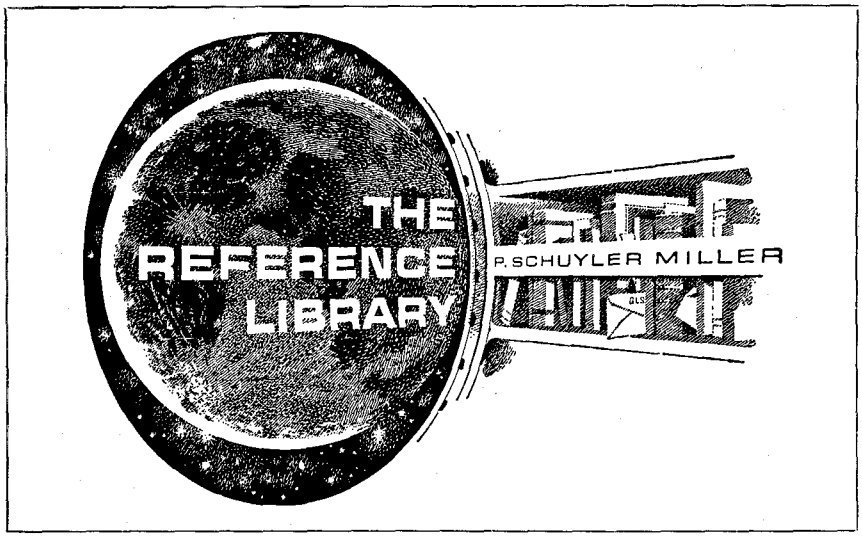

FORCE-FEEDING UTOPIA

In 1962, Robert C. W. Ettinger, who may or may not still be teaching physics at Wayne State University, published a spiral-bound mimeographed edition of a tract which he called "The Prospect of Immortality." He offered a program by which, he said, millions now living can live forever.

Now, in 1964, a considerably expanded and better organized edition of Mr. Ettinger's proposals has been published by Doubleday & Co., publishers of the equally unorthodox works of Immanuel Velikovsky — 190 pages; $3.95. I don't know how well it has been selling, but if Doubleday can tap the Velikovsky followers author and publisher should do well.

The Ettinger argument is basically quite simple. He says that within the next few centuries medicine should be able to cure all existing diseases, regenerate or replace destroyed or faulty organs, and prolong life indefinitely. Since this can't be done now, he suggests that steps be taken to preserve the newly dead by freezing in liquid hydrogen or preferably liquid helium, until the medical world is ready to resurrect them, repair them, and make them immortal.

The new version is a far better book than the original draft. It is better documented, better reasoned, better written. If you want to form your own opinion about the Ettinger proposals —no novelty to science fiction—or "Dick Tracy"—but distinctly novel as a serious program for action—the Doubleday book is the one to read. But you may then find yourself confused.

In parts of the book the approach is very light—almost poking fun at the very proposals the author is making. Is this a hoax that got away, like the recent proposal to put pants on bulls and brassieres on cows? Is it really a wholly serious proposal, as the author maintains? Or is it a program for forcing our society into utopia?

The few reviews by biologists in professional magazines have been expectedly hostile. They say that Mr. Ettinger, a physics teacher, doesn't know enough biology to read and understand the references he quotes . . . and that in any case it is unscientific to quote authorities: he should produce somebody who has been quick-frozen, thawed out and lived forever, before he can say it is possible for anyone to live forever. This kind of argument is just as nonsensical as Mr. Ettinger's biology may be.

But the real arguments against the proposal, which the author discusses in much more detail in the new edition of his book, are the social arguments. The Ettinger scheme just is not economically and socially possible.

In my lifetime I cannot earn enough, let alone save enough, to pay for the liquid hydrogen or helium that will keep my body frozen for a century or two. I doubt that it would be possible, at present, for any insurance company to work out the actuarial details of such an immortality program, let alone set feasible premiums. If I could, the "John Jones' Dollar" process of compounding interest on the remainder of my estate—which would have to be put in trust pending my revival—would create all kinds of financial complications.

And if nobody dies, the increase in population will no longer be controlled by the balance of births over deaths, but by total births. The overpopulation threat will be a present, not a future problem.

Now, Mr. Ettinger does not ignore or slip over these problems and others like them. He outlines them, discusses them, and simply says they have to be solved.

I wonder, then, if this isn't his real program: by using the public thirst for immortality, to force our society into reforms and innovations that will make it possible to cope with immortality? To bring about the ultimate in welfare states, in which society, by complete, efficient use of all resources, undertakes to keep the populace fat and happy forever? To make it necessary to drain off Earth's population—increasing without limit—not only to the other, terraformed planets but to the stars?

It's been said in various ways, by various people, that anything Man can imagine, Man can do — somehow. I wonder whether Robert Ettinger, with his program for cold-storage immortality, isn't saying: "Do it now. Let's enjoy utopia in our own time."

GREYBEARD

By Brian W. Aldiss • Harcourt, Brace & World, New York • 1964 • 245 pp. • $4.50

The unpredictable Mr. Aldiss, in this novel of the Twenty-first Century, has given us something like an English counterpart of Edgar Pangborn's "Davy" as it might have been written by John Wyndham.

Bomb testing in 1981 has resulted in an "accident" that has sterilized most of mankind and the higher animals, melted the ice caps and raised the seas.

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By 2029, England has gone back to the wilderness of pre-Roman days. But, whereas in "Davy" the survivors had come to terms with this contorted Nature, Greybeard and his associates are at bitter odds with it.

We get the earlier story in flashback. Algy Timberlane and his wife—sent by an organization that plans to record the death of mankind as a lesson to the future—find their mission meaningless and fight their way out of the control of one of the local opportunists, to take refuge in a hidden village. As the story opens, they start down the Thames to explore the new world that has evolved in their eleven years of exile.

It is a strange kind of world, in which opportunists, fanatics and madmen have gained new stature simply because they do provide strong, positive beacons of action in the midst of the drab, grubbing uncertainty. Such eccentrics never doubt themselves, and they have found their place in the wilderness, preying on the less able yet giving them a kind of security they need and cherish. The saner, reasonable Greybeards of the world find it harder going simply because they have no illusions about their own fallibility, they lack the cynical ruthlessness of a Bunny Jingadangelow, and they are quite willing to let their fellow men choose their own roads to hell, but find that they must assume leadership for their own protection. This is the situation in which Charles Massam, the nominal hero of Robert Bateman's "When the Whites Went," found himself, and it was the situation on the American frontier, whose Mike Finks are as long remembered as its Abraham Lincolns.

Perhaps I brought more to "Davy" and was, therefore, better able to enjoy its deeper levels, or perhaps Edgar Pangborn is simply a better novelist, but I believed it in a way that I can't believe Greybeard's raggletaggle world. I dare say English readers feel the same way about "Davy".

PLANET OF DEATH

By E. L. Arch • Avalon Books, New York • 1964 • 192 pp. • $2.95

The author of "The Deathstones" is again attempting a detective story set in a future galactic society, and not quite scoring. Nevertheless, he has set up an exceedingly interesting situation in which to produce his murder plot. It's almost worth the price of admission, and if the mystery were better, would be.

Dr. Adam Blackburn, the surgeon-hero who is quickly framed for his employer's murder, is one of the crew of a pseudoscientific expedition launched by the tycoon, Carteret Dunne. It develops that Dunne is really setting up a slave empire in the galaxy, finding suitable aliens and having his tame surgeons modify them to increase their usefulness. As the story opens, Blackburn has given his boss gills and installed a "think box" in the skull of a beautiful little mermaid from the water-world Agua, who is to be made air-breathing for greater accessibility to Dunne's bed and adequate board. But Dunne, in spite of his gills, is found drowned in Owanda's tank, the mermaid herself disappears, and all manner of people seem bent on pinning all sorts of crimes on Dr. Blackburn.

The situation is more interesting and better realized than in "The Deathstones," but the characters are less interesting. Keep it up, Mr. Arch.

SPECTRUM 3

Edited by Kingsley Amis & Robert Conquest • Harcourt, Brace & World, New York • 1964 • 272 pp. • $4.50

The editors of this series of English science-fiction anthologies are handicapping themselves less and less as they continue. Their selections are made primarily for English lay readers, and they are consequently relying heavily on stories that will be very familiar to most of the readers of this magazine. Nevertheless, they are at last allowing English writers to be heard.

Four of the eight stories in this third collection originated here in Astounding. Three of them certainly need no introduction: Theodore Sturgeon's "Killdozer," Poul Anderson's "Call Me Joe," and Murray Leinster's "Exploration Team"—all classics. The fourth, Peter Phillips' "Dreams Are Sacred," is an *Unknown*-style comedy in which a very practical man gets inside a science-fiction writer's hallucinations and kids them to death.

Alfred Bester's "Fondly Fahrenheit" is another classic, which was made into an outstanding TV program, or so I'm told. It's the one in which an android goes berserk as the temperature rises. It first appeared in *Fantasy and Science Fiction*. England, and *New Worlds*, are represented by one of the strangest of J. G. Ballard's stories, "The Voices of Time"; Arthur C. Clarke's quiet, underemphasized "The Sentinel" appeared first in the former *Avon S.F. Reader* rather than in his own country.

Finally there is "We Would See a Sign" by Mark Rose—no prior credits given—another very short story, bitterly depicting the crumbs of human society after the next war.

No single book can hope to show the whole rich spectrum of science fiction—not even one of the gigantic anthologies of the past—but Messrs. Amis and Conquest are beginning to give their novice readers at least a glimpse of what is there.

THE GREAT TIME MACHINE HOAX

By Keith Laumer • Simon and Schuster, New York • 1964 • 190 pp. • $3.95

The author of the "Retief" stories about impudent galactic diplomacy has now expanded a *Fantastic* novelette into a full-length frolic through time. If you don't think an evening's reading is worth the price of a couple of drinks and a bad movie, you can wait for the paperback. The book won't be a classic, it hasn't the controversial meat of a Heinlein opus, it isn't the technical fretwork of a Hal Clement world, but it's the kind of fun we used to get from Henry Kuttner when he was "Lewis Padgett." Anyone remember?

Chester W. Chester IV finds himself, in 2064, the owner of a busted circus, a moldering mansion, and a growing

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bill for back taxes, all inherited from his great-grandfather. Under the house, however, is a rather remarkable computer which has tended to its own improvement since Grandpa stopped. As a result of its potent control of natural forces and a slight misunderstanding, Chester, the manager of his circus, and an android personification of the computer soon find themselves deep in the Neolithic past . . . then in a parallel future . . . then . . .

But that's the story.

INDEX TO THE SCIENCE FICTION AND FANTASY MAGAZINES: 1963

Compiled by Al Lewis, • 1825 Greenfield Ave., Los Angeles, California • 90025 • 1964 • 62 pp. • 75¢

This is the third in the series of annual indexes published by Los Angeles fan Al Lewis in excellent lithoprint. They are intended as supplements to the long overdue second volume of Donald Day's *Index to the Science Fiction Magazines*, which is to cover the years 1951-1960, inclusive. If you don't have the earlier indexes, the volume for 1961 is 60 cents and the 1962 index is 75 cents—all three from the compiler-publisher.

In this index, the scope has been enlarged to include the weird and fantasy magazines, which increasingly overlap science fiction—and are overlapped by it. British magazines are included with the American publications, except for the British reprint editions of Analog and *Magazine of Fantasy & Science Fiction*. However, the "reprint" *Venture* is indexed because its contents are so different from its U.S. predecessor.

There are four sections: (1) the tables of contents of the indexed magazines for 1963; (2) an author listing; (3) a title listing; and (4) an index to book reviews. Original sources of reprints are given . . . which is more than some publishers now do.

This kind of work justly earns some S-F fans—and I'd better amend that to *many*—an apt title which was applied to some nonprofessional archeologists: "part-time scholars." Fans—including some who apparently don't read Analog but have heard of it—can't seem to realize that this is not a fanzine review department. However, I hope that "The Reference Library" will always find space to notice work like this.

AN AUTHOR INDEX TO ASTOUNDING/ANALOG
Part II—Vol. 36, #1, September, 1945 to Vol. 73 #3, May, 1964

Compiled by Donald Franson • National Fantasy Fan Federation, • 1964 • 7 pp.

We can hardly let this one pass, though N3F mailing pieces are generally published only for exchange among members of the Federation. Mr. Franson says it is available from him, on request, at 6543 Babcock Avenue, North Hollywood, California 91606. I trust he isn't swamped.

This is, as the title suggests, strictly an author index, and to fiction only. The names of the stories are not given; only a series of numerical references, which I presume give the month and year in which the story appeared. That is, "Van Vogt, A.E.—8/9/10-45" means a three-part serial published in Astounding for August, September and October, 1945. (It turns out to be his "World of Null-A".) An index to the first thirty-five volumes is to be published later: presumably it will be "Part I."

This is pretty skimpy coverage by some of the standards set by other fans whose work has been mentioned here: e.g. Al Lewis' annual compilations, or the Australian index. Still, if you keep a back-file of Astounding/Analog, it may help you find stories by particular authors.

AUSTRALIAN SCIENCE FICTION INDEX: 1939-1962

Compiled by Graham Stone • Futurian Society of Sydney, Sydney, Australia, • 1964 • 113 + viii pp.

Neither the book, a nicely multigraphed, well-bound job with heavy card covers, about three-quarters letterhead size, nor the box it came in has a return address, nor is a price mentioned. If I learn of one, I'll let you know, though this is less of a "must" for the average Analog reader.

The compilation covers, to the best of Mr. Stone's ability, all science-fiction magazines and paperbacks published in Australia between 1939 and 1962. It replaces and extends a previous compilation in two parts—1955 and 1958. Hard-cover books are excluded, and so are "Australian" editions of publications printed in England. Data on the publishers and history of each publication are in an appendix. Some of the magazines had the titles of American magazines and most of them were made up primarily of stories by American authors; however, only one—an issue of *Orbit*—seems to have been a direct reprint. Australian and, probably, British authors were also represented.

An issue-by-issue listing of the contents of the magazines is followed by an author index to the paperback books. Then comes an author index to the fiction in the magazines and books, a title index to the stories, and the bibliographical appendix.

THE BURNING WORLD

By J. G. Ballard • Berkley Books, New York • No. F-961 • 1964 • 160 pp. • 50¢

Elsewhere I have called Brian Aldiss unpredictable. The adjective fits his fellow writer of superlative English science fiction, J. G. Ballard, even better.

Having drowned the world and stripped it with hurricanes in previous books, Mr. Ballard now parches it to death. The mechanisms called in to bring about the world-wide drought are not too plausible: stream pollution has suddenly produced a monomolecular film of a new polymer, which spreads over the surface of the seas and prevents evaporation. Rains no longer fall; streams dry up; the water table is exhausted; and mankind flocks to the seaside, where in a nightmare anarchy they subsist on the products of distillation.

But the author is not interested in his rationalization, but in creating another of his nightmares of human passion and perversion, in which everyone is a little bit insane and the most badly cracked often lead the way by

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force and determination. The same forces that are at work in Brian Aldiss' "Greybeard" are operating here, and it is fascinating to see the similarities and differences between the two books: Ballard with all stops pulled out, Aldiss playing softly—two sets of variations on essentially the same tune.

But in this case the nightmare grows too extreme, too unbelievable, and the reader loses any ability to identify with the miserable Dr. Charles Ransom, or even to care much what happens to him.

THE DARK LIGHT-YEARS

By Brian Aldiss • Signet Books, New York • No. D-2497 • 1964 • 128 pp. • 50¢

A considerably shorter version of this story appeared last year in *Worlds of Tomorrow*. It is something of a comedown for this talented English author. The theme is old, although this particular variant isn't, and the effort to use shock tactics merely becomes boring.

An exploring expedition on a far planet encounters several members of a mentally remarkable but physically repulsive race. These shapeless creatures have an extraordinarily intricate code of social behavior which has seemingly left its roots in logic and necessity far behind. They literally wallow in filth and spice it with their own excrement for reasons that are plain and compulsive enough to them, and glimpsed by the reader who has met them before the Earth crew do, but are understood by no one else.

There is a first conflict between the party who look on the creatures as big game, and those who consider them intelligent. This argument produces a similar schism on Earth, where various private plotlets move in and out around the main fracas. Over and over and over again the lesson is rubbed in that our customs aren't necessarily the only customs an intelligent race may have. Granted, the utods are about as different from us as they can be, their repulsiveness goes beyond reinforcing the lesson. Others have done it better.

THE VALLEY OF CREATION

By Edmond Hamilton • Lancer Books, New York • No. 72-721 • 1964 • 159 pp. • 50¢

This fantastic adventure dates from 1948, in the author's middle period. It was a complete novel in *Startling Stories* and is pretty typical of the magazine and the time, but considerably evolved over the author's similar yarns for *Weird Tales* in the '20s and '30s.

An international group of mercenary soldiers have been helping a Chinese warlord against the Reds, and have been defeated. They are hired for another conflict, in a hidden valley in the mountains of central Asia, where they will fight against the Brotherhood—a group that lives in partnership with wolves, tigers, horses and eagles. They can talk to these animals telepathically, share their cities with them, and treat them as equals and partners. The group that has hired our friends and their unfamiliar weapons is in revolt against this whole concept: they want animals kept in their place, as on the outside.

Naturally, the hero, Nelson, falls in love with a girl of the Brotherhood and presently winds up in a wolf's body. It appears that the people and animals of the valley are descended from extraterrestrials whose spaceship was wrecked here millennia before, and who implanted their intelligences into what looked like the five most promising races: tigers, wolves, horses, eagles —and apes. Only the apes evolved into men, but the other races maintained a level higher than their brute kin outside the valley.

Some readers dislike this kind of story intensely. Others enjoy yarns in which the hero is up against insuperable odds, whether the natural forces and animals of a strange planet or the plotting of a human or superhuman enemy. It gives us personal satisfaction to believe that he can overcome such odds, and presumably that we could, too—if we had to. We also like to find strange, great, mysterious powers lined up with our hero ready to help out when he—and we—have earned their support. What else is the basis of the world's religions?

Of course, all this can be made very silly by an inept writer. Rationalists can't stomach it from any writer. But Edmond Hamilton always has had and still does have the ability to make such things believable, if you're the kind that *can* believe. You'll find out which class you're in by reading "The Valley of Creation."

BEYOND THE SOLAR SYSTEM

Paintings by Chesley Bonestell, text by Willy Ley. Foreword by Wernher von Braun. • Viking Press, New York • 1964 • 108 pp. Ill. • $6.50

Chesley Bonestell's paintings of interstellar flight objects are, as usual, fascinating and beautiful and imaginative—scenes illuminated by binary stars shining on a planet circling one of them, throwing double shadows of different colors. A planet glowing eternally red-hot in the fierce illumination of blue-white Pleione—pictures of a type Bonestell originated and first presented in the pages of Astounding Science Fiction here seventeen years ago.

Willy Ley's text briefly discusses rocket travel and the possibilities of interstellar rockets. (Remote; it would take millennia. Possible for dirigible, self-contained planetoid colonies.) As a dedicated rocketeer, Willy Ley does not choose to discuss non-rocket propulsion discoveries of the future.

Willy writes with style, and a strong sense of history; the discussion of how we know what we know about the stars, nebulae, and galaxies is excellent.

But Willy Ley has a little too much history in one respect; he apparently hasn't caught up with current astrophysical knowledge concerning novas, nucleogenesis, main-sequence stellar dynamics, and supernovas. He doesn't mention that stars, after burning their original supply of hydrogen to helium, then go to a helium-burning phase, where 3 He^4 combine to C^{12}, followed by a series of helium fusions yielding successfully heavier nuclei—the source

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of all the heavy elements up to Fe^{56} at least.

Novas now appear to be not stellar explosions—several novas are known to have repeated the nova flare-up several times—but some kind of massive matter interchange between the stars of an extremely close binary—sort of a super-solar-flare phenomenon between two stars only about one or two radii apart.

Epsilon Aurigae, originally believed to have a dim companion some 2,000 million miles in diameter, the largest of known stars, turned out to be a mistake in interpretation. Some years ago it was recognized that the effects observed were being produced by the hot, brilliant Epsilon Aurigae A and a relatively dim companion rotating in a relatively dense halo of gases—but not a star two billion miles in diameter.

There are several instances where Willy Ley has correctly stated what astrophysicists used to believe the facts to be—but re-examination of the data, plus new data, has led to completely different interpretations, which Ley doesn't mention.

The historical material should have been extended slightly, to include the immensely important role that radio-astronomy has played in giving us a far better, more detailed understanding of the shape of our own Milky Way galaxy. JWC.

REPRINT ROUNDUP

THE BEAST

By A. E. van Vogt • Macfadden-Bartell Corp., New York • No. 60-169 • 1964 • 160 pp. • 60¢

SARGASSO OF SPACE
PLAGUE SHIP

By Andre Norton • Ace Books, New York • Nos. F-279 & F-291 • 40¢ each

Gnome published these as original hardbacks by "Andrew North," back in 1955 and 1956. Ace later brought out paperbacks under the same pseudonym, but now gives credit where it is due. They are the first two stories about Dane Thorson and the trading ship, *Solar Queen*, on the strange worlds of Limbo and Sargol. The Free Traders of space, introduced here and in sequel, "Voodoo Planet," appear in Miss Norton's other books. Read 'em, if you haven't.

ANALOG I

Edited by John W. Campbell • Paperback Library, New York • No. 52-293 • 1964 • 160 pp. • 50¢

ASTOUNDING TALES OF SPACE AND TIME

Edited by John W. Campbell • Berkley Books, New York • No. F-951 • 1964 • 190 pp. 50¢

The first is a paperback edition of last year's first Analog annual. The second is a new edition of the 1957 Berkley paperback, which contained seven stories from the grand old "Astounding Science Fiction Anthology." Good chance for comparison shopping.

DAY OF THE GIANTS

By Lester del Rey • Airmont Publishing Co., New York • No. SF-5 • 1964 • 128 pp. • 40¢

Avalon Books published this in 1959, and it was better than most of the books they've had since. The gods and giants of Norse mythology return to Earth for real to fight it out.

8TH ANNUAL EDITION:
THE YEAR'S BEST S-F

Edited by Judith Merril • Dell Publishing Co., New York • No. 9774 • 1964 • 382 pp. 75¢

Any year's best science-fantasy anthology is likely to be Judith Merril's. This one covered 1962.

BEYOND THIS HORIZON

By Robert A. Heinlein • Signet Books, New York • No. D-2539 • 158 pp. • 50¢

Another reissue, and one of Heinlein's best stories of the future.

TIME IS THE SIMPLEST THING

By Clifford D. Simak • Crest Books, New York • No. d-752 • 192 pp. • 50¢

This story of the telepathic exploration of space is one of the author's strangest and least characteristic books. It was serialized here and published by Doubleday in 1961.

THE INVISIBLE MAN

By H. G. Wells • Airmont Publishing Co., New York • No. CL-40 • 127 pp. • 40¢

One of a series of paperbacks which Airmont is publishing for teen-age readers. It has an interesting introduction by Robert A. W. Lowndes, veteran SF fan and editor.

THE DAY OF THE TRIFFIDS

By John Wyndham • Crest Books, New York • No. d-741 • 1964 • 191 pp. • 50¢

This new paperback edition of the 1951 classic about vegetable monsters prowling the Earth may have been intended to synchronize with the British film that sneaked in and out of the drive-in's and won't be seen by most people until it turns up on television.

PILGRIMAGE TO EARTH

By Robert Sheckley • Bantam Books, New York • No. F-2812 • 167 pp • 50¢

Still another reissue, and still another bargain. Bantam first brought out this book as an original paperback in 1957. If you don't remember it, get it.

THE BIG BOOK OF SCIENCE FICTION

Edited by Groff Conklin • Berkley Books, New York • No. F-975 • 176 pp. • 50¢

SELECTIONS FROM SCIENCE-FICTION
THINKING MACHINES

Edited by Groff Conklin • Bantam Books, N. Y. • No. EP-63 • 201 pp. • 45¢

THE OCTOBER COUNTRY

By Ray Bradbury • Ballantine Books, New York • No. U-2139 • 276 pp. • 50¢

Another reissue of the 1956 paperback. These are Bradbury's early weird stories, published by Arkham House as "Dark Carnival," and rewritten for this edition. They aren't science fiction, but they are Bradbury's best stories.

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BRASS TACKS

continued from page 4

them effective challengers at all times. That good politician Theodore Roosevelt completed the rout by forcing his own party to accept some of their more reasonable demands, and thus made his own party the majority party for another generation, until FDR welded together a new majority in 1932.

So don't get too excited about what is happening this year. It appears just now that Goldwater will lose, and if he wins, it will be because of Johnson's aide's morals—something far removed from the basic questions we ought to decide. Bryan lost, and it was probably a good thing, since Roosevelt and Wilson were able to secure the reforms he wanted and put them into effect without the dislocations which would probably have occurred if Bryan and his supporters had had the task of imposing them. And don't be unhappy because Goldwater has been backing and hedging and compromising. He must put together a majority to get elected, and he must keep the opposition from being so unhappy that they'd rather fight than switch. (After all, Lincoln said as little as possible during the campaign of 1860.) He *must* win, not just this election, but several; it took FDR ten years and more to change the direction of the government, and he can't do it in less time. That is another thing which makes the situation livable for the losers. And don't be too worried because the "liberal" viewpoint prevails so enormously in the news media. That, too, has happened before, and it is this basic agreement which makes elections without bullets possible. Dickens noted it in Martin Chuzzlewit, and Toqueville noticed it. The question about supporting our less-productive members may soon become irrelevant, since our economic machinery is so well equipped to supply them, and the spirit of the times, not just here but all over the earth, is insisting on it. Think of some of the questions of the past. There were monarchist officers in the Continental Army who petitioned Washington to become king, yet where could you find monarchists today? And we don't even miss them! The "liberal" viewpoint became dominant in the Thirties because the older one had too many shortcomings; if it had been as good and as successful as the Goldwaterites insist, the "liberals" could never have taken over in the first place. A wise opposition would not be asking us to return to it, but would be trying to work out a new synthesis which will *add* something to what the "liberals" offer. The present proposals smack of trying to get yourself unborn again, and in going contrary to what everybody else in the world is doing, could easily isolate us and leave us alienated from them—something very dangerous to us.

Incidentally, is the question of supporting the incompetent as clear as you see it? Civilization is not a one-man show, regardless of how much we owe to its leaders. The ideas may come from them, but carrying these out requires the co-operation of a lot of other people, and they must be willing, or we have arrived at a police state. Economic values are also a social product, not just the result of someone's shrewdness. Increasing land values, for instance, depend on increasing population in a place, and the factory needs sweepers just as much as engineers. That anyone should feel that his being a man entitles him to live without contributing to his society is wrong and regrettable, but not just a product of the present time. Every civilization has had its parasites—placemen and sinecurists, the idle children of the rich, the nobles whose function disappeared when they no longer were the military force of the State. For myself, I'd rather see a thousand useless men eating, and maybe a few of their children amounting to something, than the same money supporting a couple of dozen sons of the rich on the Riviera. Survivability of the individual is important, but what do you do after you survive? Perhaps there was a cave man who bopped his neighbor over the head while he was thinking about inventing the wheel, and so set civilization back a thousand years. If you worship it, you're going to end up with Machiavelli, and with Louis XI, sitting shivering in his old age in Plessis-le-Tours. To overemphasize it assumes that all the important characteristics are going to be Mendelian dominants, and never skip a generation. The son of the bum turns out good, and the son of the genius, bad, just often enough to remind us that we dare not claim too much for heredity as we now know it, important as inbred abilities are. We all probably have both kings and murderers among our ancestors, if we could only trace them back far enough.

And I do enjoy reading your editorials, even when I take exception to them. We all could use something to stimulate our thought, even though it might be contrary to our present beliefs. Don't imagine that I'm trying to shout you down; you do me good.

JOSEPH M. WILSON
507 North Oak Street
Normal, Illinois

A most excellent and succinct analysis of political philosophy-theory vs. the pragmatic necessities of politics! Thanks!

Re "incompetents": A man who is a good, solid, working janitor earns more honest respect than a sloppy, slippery, lawyer, doctor, or research scientist. The incompetent I'm objecting to is the man who won't work at what he can do, whether that means he won't work at all, or won't work at the handy-man-janitor job he can handle, and insists on being hired as a high-status technician, which he can't handle.

Genetics is a statistical process; sociology alters values. The results become confusing. My father was amusedly interested in geneology, and discovered with delight that one ancestress was tried and condemned as a witch in Salem—by a judge who was also, on another line, an ancestor! A nice combination of Lord Governors and pirates is pretty standard. As to kings and murderers; remember that the difference between a murderous rebel and a noble revolu-

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tionary is that the rebellion is a revolution if it succeeds!

Nevertheless—the way to direct a statistical process is to apply a statistical pressure. Pressure that loads the dice against the non-useful individual is necessary — and that we have in high inheritance taxes to dispossess the useless rich heir.

But how about Social Justice that equally dispossesses the useless and penniless heir? Is it honorable to be a penniless slob, but wicked to be a rich slob? In that case, it's obvious why wickedness seems to be so popular!

Dear Mr. Campbell:

Your editorial, "The Extremist," in the November Analog was *extremely* interesting. Of course "*extremist*" has now become a Finagle word. Personally, I would define the extremist response as one which always involves the ultimate in force, like using a sledge hammer to crack a hazel nut. Instead of getting a cracked nut, you get a grease spot. It is also like the principle of "overkill." It would seem to me that maturity in man involves conditioning the response to the cause. An infant would cry no louder if its mother were killed than if its meal were delayed. When Alexander the Great used an axe to solve the problem of the Gordian knot, he became the archetype of all extremists. Unfortunately, the raw use of force is often a necessity but if we hope to solve problems without wiping out everything, we must use our intelligence and employ the least amount of force. Force solves nothing but with luck it may help us to obtain the time to effect a true solution. Otherwise, the trauma which results from force may create more trouble than the original problem or we may be left with—to paraphrase the bard—a brave new world that has no people in it. There can be no freedom in a country with the motto: "Shut up! This is a free country".

J. Frederic Walker
Post Office Box 27
Haddam, Connecticut

I like very much that definition of an "extremist"!

Dear Mr. Campbell:

You have been hinting at some rather kookie, crackpot ideas in the past few years, but "The Extremist" editorial in the November 1964 Analog proves beyond a doubt that your Ph.D. should be revoked. It isn't merely that you don't believe in Santa Claus, but you are trying to persuade other people that he doesn't exist. If it weren't for influential reactionaries like you, Congress would long ago have repealed the Law of Gravity and our space program would now be getting off the ground.

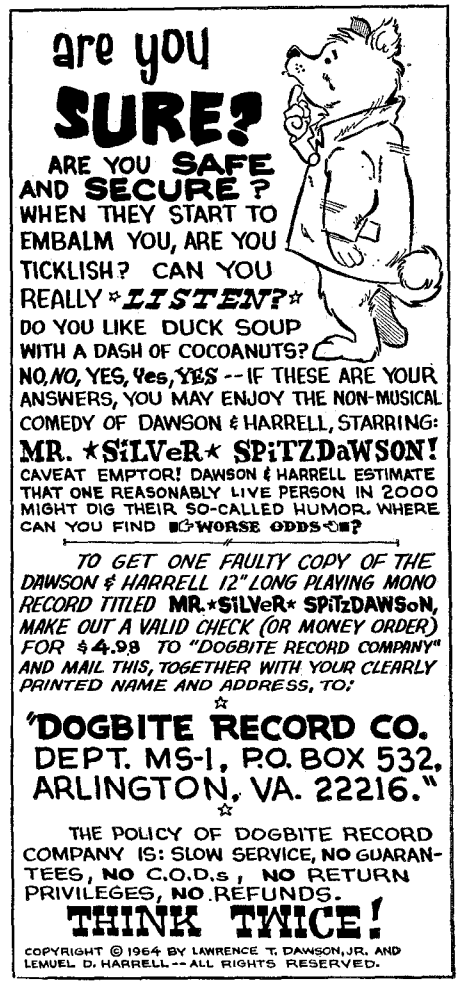
Seriously, you didn't have space to explain it in your editorial, but some readers may be interested in the mechanics of how nonconformist ideas are actually, even deliberately suppressed. Merged newspapers and syndicated columnists are the rule today —no place for a William Allan White. The news and picture magazines have always been staff written, and the *Saturday Evening Post* no longer considers unsolicited articles and stories. Only three or four other unspecialized mass-circulation magazines still take free-lance material. Respectable conservative journals have minuscule circulations and most of them don't appear on the stands. One of the few ways a nonliberal idea can get through to the average reader is disguised as science fiction—but is the reader of science fiction average?

The scholarly journals and university presses have a built-in mechanism ensuring conformity and mediocrity. Editors must refer manuscripts to several "recognized authorities" in the field. Any manuscript that says something new and worth saying is bound to conflict with the prejudices of one or more of the "authorities." Aside from prejudices, few "authorities" are going to recommend publication of a manuscript that makes their own previous work look rather silly. This is why university-press lists consist largely of books on James Joyce's use of the apostrophe and edited collections of President Coolidge's laundry lists.

Increasing conformism seems to be a natural law for all human societies. The bigger and more powerful the state, the more distant the day of reckoning. Sooner or later, however, once the generally accepted myths get too far from reality, disaster ensues.

It may be coincidence, but human knowledge has increased most rapidly in systems of comparatively small states: the city-states of Greece and Renaissance Italy and the national states of modern Europe, 1648-1939. In contrast to Europe, one state dominated the whole Chinese world; the system remained static until disrupted from without.

When any one society of a city-state or nation-state system became too conformist, the neighbors were always happy to come in and unconform it. The rule was reform or perish. To cite a few examples: the reforms in Prussia after the defeats by Napoleon, in Russia after the Crimean and Japanese wars, in Austria after 1866. These reforms were only grudging, however, and all three states perished in 1917-18.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BRASS TACKS

Britain almost perished in 1940 as a result of the pacifist-League myths of the 1930s, and among the most widely accepted liberal myths in the United States today are Ban-the-Bomb, United Nations, and World Public Opinion. How much longer will we survive?

J. E. McSHERRY
427 East College Avenue
State College, Pa. 16801

University presses also produce excellent texts like "Secular Latin: Poetry of The Middle Ages."

Dear Sir:

With reference to "This is English page 41—November '64—the quotation could have been from a description of the Ore Beneficiation plant illustrated on page 982—*Blast Furnace & Steel Plant*, October 1964.

In reading the technical publications of one's own field, it is difficult to realize how "far out" they may seem to an expert in other fields.

However, I offer you the description "elastic insomer interfacial environmental barrier" used in a recent publication. ? ? When I studied engineering in 1932 we "dark ages" plumbers called it a "Rubber Gasget."

I follow with interest frequent parallels between articles in your Analog in *American Scientist.*

J. WILLIAM DE POY
4255 Detroit Avenue
Oakland 19, California

"Give the man a gooood see-gar!" It was a piece on an ore beneficiation plant, but from Chemical & Engineering News, *where it was a perfectly appropriate and succinct statement for the perusal of chemical engineers. Your lovely "elastic isomer interfacial environmental barrier" belongs in a different class altogether; that's gobbledegook—i.e., an unnecessary and hyperpolysyllabic way of saying something simple.*

Dear Mr. Campbell:

Is it possible that a geo-magnetic storm produces the kind of energy that will change *Bacillus fluorescens* into an ultra-rapid gelatin-liquefying *Bacillus fluorescens liquefaciens?* This question occurs to me because of the use of ionizing radiation on microorganisms to increase yields of antibiotics. Also, it seems to me that mutation from causes other than geomagnetic storms is an explanation that would have to be eliminated before the extraterrestrial explanation could have much support.

What intrigues me is the "yeast-like" organism mentioned in the article. Anything like a yeast that has such biochemical characteristics as clearing silver grains and liquefying gelatin is interesting, regardless of where it originated.

MERVIN D. MILLER
513 East Caney, Apt. 1
Wharton, Texas 77488

The magnetic storms cause mutations of the type observed only when Venus is in conjunction with the Sun. Astrology vindicated?

Dear John,

Re N.E.W.S. question October Analog. Suggest you take a good look at a map or rephrase your answer.

Alaska is *not* the farthest east state by your definition. Since the international date line jogs around the chain (Aleutian) and is west of Little Diomede Island, Alaska celebrates the same days at the same time as the rest of America. Using your definition that the date line is the farthest west you can get, then Alaska does not go across it, and Maine becomes the easternmost state. If, however, you change the answer to your question to read the 180th parallel, then Alaska is the easternmost, since the Near and Rat Island groups of the Aleutian chain are east of this line, with the 175th eastern longitude falling approximately between the two groups.

We Alaskans are naturally happy to be mentioned three times in one issue of Analog since a little advertising never hurts.

PETE DAVIDSON
Kotzebue (66 30N 162 30W) Alaska

Another of the scores of letters that caught my goof on that one!

"HYPERINFRACANIPHILIA"
continued from page 7

new clothes for them, and guarantee them a life-time supply of quick-frozen TV dinners . . . but the new clothes are no better than the old. They don't keep themselves clean, repair their own careless rips and burns, or adjust size to match growing children. The new houses aren't a bit better than the old; their windows break, and the wind lifts shingles just the same, and the poor people living in them know they've been cheated.

The great advantage of nudity is that the animal or human skin is self-repairing—and arranged to encourage the wearer to avoid carelessness in the matter of rips and burns—reasonably self-cleaning, and self-adjusting to the changes in the wearer's size and/or shape.

The advantage of free forest living is that trees—although they do constitute a somewhat leaky roof—are self-replacing, self-repairing, and if one falls down, there are always others you can move under. There's no work involved.

These completely unselfish poor people, however, are not really interested in forest living, because of the lack of adequate TV entertainment, and the unsatisfactory food supply.

It is *not* a matter of poor education, either. Let's get that nonsense out of the way. Abraham Lincoln had a darned sight less in the way of economic, social, or educational opportunities than the poor people of Appalachia have. And, moreover, millionaire scions graduating from Harvard turn out to be just as totally unselfish—they won't do a thing for themselves—as the worst of Appalachia's people.

The best way to express the problem, I think, is to recognize that no matter how you heat-treat or work

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a piece of cast iron, you're not going to make a usable spring out of it. There are, however, a wide variety of steel alloys which, given different, but appropriate heat and work treatments, will yield springs. And there are alloys which make highly effective springs in a straight as-cast condition. In analogy, you can't educate a piece of cast iron—and there are some alloys that don't need to be educated; they have the wanted characteristics built in. Plenty of individuals have proven resoundingly that a man who has that education-absorption characteristic gets his education even if it's clearly impossible. The Negroes who complain so bitterly about poor educational opportunities, for instance, should consider George Washington Carver's life a bit more carefully; he, like Abraham Lincoln, saw to it he got an education, despite the near-impossibility of the conditions he faced. These were selfish men indeed; they worked hard doing something for themselves, instead of whimpering to have others do it for them.

Michael Faraday did it in science. How about "Joseph Conrad," an essentially uneducated Polish seaman who decided to write in a language—English—other than his native tongue because his works would have a wider market.

Certainly there will always be a great majority of individuals who don't have that tremendous level of built-in drive and determination—people who can, with adequate educational opportunity become useful, self-supporting and self-respecting citizens who, without that external help, would gravitate to the "unselfish" category of those who don't do things for themselves. The alloys that make powerful and highly elastic springs in the as-cast condition are few, highly expensive, and seldom used, too; practically all springs are the result of starting with a good, workable alloy, and applying heat and work treatments—educating an educable alloy.

But to hold that *all* alloys are educable to the same degree is absolute nonsense. What school was it that turned out Einstein? Did they operate that school only once, for one individual, for some reason?

Now one of the most important aspects of education for the low-grade student is convincing him that he damned well better learn as much as he himself is able to—because if he doesn't work at it, he's going to pay for his laziness in future misery and discomfort.

The hyperinfracaniphiliac however, is busy assuring the inferior human alloy individuals that they should, indeed, be unselfish—and let other people support them. They are repeatedly assured that they don't have to exert any extra effort, because they will be assured equal rewards in our society, even if they don't work.

Why shouldn't the "drop-out" drop out? Go ahead, sucker—work and get all that education, and get a job. So what does it get you, huh? The drop-out gets welfare, relief, unemployment payments, et cetera, and anti-poverty supplies, and has three hundred sixty-five holidays a year, and a lot more orators defending him, discussing his good, unselfish attitude than you have defending yours!

What pressure is there to make the lower end of the ability scale even try to develop himself? He could, with some real effort, achieve considerable development of his limited potentials, and achieve self-respect—by being selfish, and doing something for himself. Instead, encouraged by all those hyperinfracaniphiliacs, he relaxes, stops making even minimal efforts, and achieves self-respect by listening to the TV orators explaining how he's just as good as anyone else because he's human, and he has just as much rights because he's a citizen—he got born here, which, fortunately, takes no effort whatever on his part.

Why *should* this individual of low inherent ability try to make the most of his limited potentials?

You, poor sucker, were born not only with potentials, but with a drive to use them. (Or you wouldn't have achieved an educational level that makes this magazine interesting to you.) You're stuck with being selfish, and working for your own development. He isn't—so why should he, since he will be honored, respected, and fed without working?

The hyperinfracaniphiliacs are establishing a situation with the interesting characteristic that those individuals born with relatively low potentials are strongly encouraged to *not* develop what talents they have! If he doesn't try at all, he can't fail—and he will retain self-respect because he is assured that he is Human and a Citizen and An Underprivileged Man to whom The Society Owes Something.

He doesn't try, therefore doesn't fail; if he did make a real effort, and fully recognized that his abilities were limited, he wouldn't have the comforting self-respect of accepting that he is, really, Just As Good As Any Other Man. He couldn't feel so wholeheartedly that he was an Oppressed Victim of Society and that his poverty was not his own fault.

Poverty doesn't make poor people; poor people make poverty. The test is quite simple; consider what has happened when a different type, or group of people has been put in a precisely similar circumstance.

It isn't slums that make slum-dwellers; slum-dwellers are a type of people who, when they move into an area, make slums.

You can not solve that problem by giving poor people goods and money; they'll make poverty of it. You can't end slums by moving the slum-dwellers into new, clean, well-built housing—but you can end the slum by moving non-slum-dwellers into the dirty, rat-and-louse infested, run-down buildings of the slum. Rat traps are cheap; DDT is readily available, soap, water, scrub brushes, paint and paint brushes are readily come by. Most slum areas have heavy unemployment; how come all those unemployed people can see nothing to do in their dirty, dilapidated and unpainted slum homes? How come they keep complaining about it so loudly, and demanding that somebody should fix it for them?

Because they're so unselfish, of course.

The Editor.

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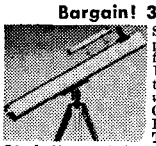

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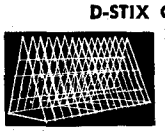

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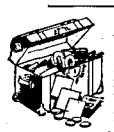

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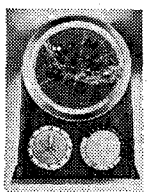

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Fascinating new hobby—collect the 103 known elements. New Kit provides hours of fun, helps you quickly learn all basic scientific facts. Most elements easily obtained in pure or compound form. Contains all materials needed for attractive, instructive display; rugged simulated black leather 3-ring binder with slide-away plastic handles; 5 heavy clear vinyl insert sheets, each with 20 (2" x 2") specimen pockets; 5 insert identification cards for 100 elements; 63-page book. "Atoms, Crystals, Molecules," by A. H. Drummond, Jr., gives *periodic table of elements, classroom intro. to atomic* structure and chemical bonding.

STOCK NO. 70,720-A, Complete kit .....$7.50 Ppd.

STOCK NO. 70-721-A, Binder with handles only $2.50 Ppd.

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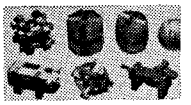
WOODEN SOLID PUZZLES



12 Different puzzles that will stimulate your ability to think and reason. Here is a fascinating assortment of wood puzzles that will provide hours of pleasure. Twelve different puzzles, animals and geometric forms to take apart and reassemble, give a chance for all the family, young and old, to test skill, patience and, best of all, to stimulate ability to think and reason while having lots of fun. Order yours now.

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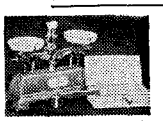
LOW COST PRECISE LAB BALANCE



Built for hard, daily use. Weighs materials from 100 miligrams to 100 grams, can be used for proportionate measuring. Has removable plastic pans 60mm in dia. Features base of rugged cast iron and adjustable one piece beam for balancing. Overall ht. 5½" x 7" long. Comes complete with set of 12 weights ranging from 100 mg to 50 g and pr. of tweezers in wooden box. Imported.

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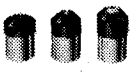
NEW KELLNER STANDARD 1¼" EYEPIECES



Wide, flat fields, excellent color correction, coated lenses. All have standards 1¼" outside diam., 50-degree apparent field of view. Ample eye relief. Attractive chrome and black finish, easily visible markings.

Stock No.	Eye Piece	Focal Length	Eye Lens Diam.	Field Lens Diam.	Price Ppd.
60,492-A	(A)	9mm	5mm	7.5mm	$9.75
60-493-A	(B)	12mm	7mm	8mm	9.25
60,494-A	(C)	18mm	15mm	19mm	9.00

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Stock No. 70,683-A .....$5.00 Ppd.

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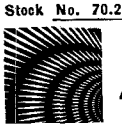
With this Kit, you can collect fluorescent rocks, paint with living light, write secret messages, learn invisible detection methods, even make a fluorescent Christmas tree! Kit uses long-wave blacklight, which is completely harmless to eyes, but causes fluorescence in over 3,000 substances. Includes Magic Glow Lamp, universal laboratory lamp stand, invisible water paints and ink, fluorescent crayon, tracer powder, pen, 3 brushes, specimens of fluorescent rocks: wernerite from Canada, fluorite from England, willemite from U.S.A. Plus book of 40 experiments.

Stock No. 70.256-A .....$11.95 postpaid



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A NEW, TIME-SAVING SHORT CUT TO ACCURATE ANSWERS IN DOZENS OF APPLICATIONS

Here's your introduction to a whole new world of technology. Unlimited experiments. Vivid demonstrations. Fun for lab and home experimenters, hobbiests. Inexpensively measure one part in billion. Measure diffraction pattern produced by lasers. Measure diffusion of molecules in solution or heatwaves. Study liquid flow, stress lines, distortion of metals. Reproduce *math concepts visually. Photographers* can harness this fascinating optical principle and achieve fantastic visual effects. Technically, moiré patterns are predictable patterns created by superpositioning of one pattern over another. Using elements which include equi-spaced linear, logarithmetic and circular rulings, Dr. Gerald Oster, *Brooklyn Polytechnic Inst.*, has developed a *complete new* scientific tool. Kit contains 8 basic patterns on both clear acetate lantern slide size 3¼" x 4 (.005" thick) and .010" thick white Kromecoat paper 3¾" x 4½" (coated one side): (1) Coarse grating, (2) 65-line grating, (3) Logarithmic scale grating, (4) Radial lines, 5-degree, (5) Equispaced *circles, (6) Fresnel zone plate,* (7) *Sphere projection,* (8) Cylinder projection; one piece 3¼" x 4" 150-dot screen on film; copy Dr. Oster's book, "The Science of Moiré Patterns", an authoritative introduction to the fascinating world of moiré.

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Stock No. 60,462-A. Same as *above without book* ***$4.00 Ppd.***

MOIRE PATTERN ACCESSORY KIT. For additional experiments. Incl. metallic balloon, calcite, two kinds of diffraction gratings, one-way mirror foil, polarizing materials, Ronchi rulings, assortments of lenses.

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Terrific Buy! American Made! OPAQUE PROJECTOR

Projects illustrations up to 3" x 3⅛" and enlarges them to 35" x 30" if screen is 6½ ft. from projector; larger pictures if screen is further away. No film or negatives needed. *Projects charts, diagrams, pictures,* photos, lettering in full color or black-and-white. Operates on 115 volt, A.C. current, 6-ft. extension cord and plug included. Operates on 60 watt bulb, not included. Size 12" x 8" x 4½" wide. Weight 1 lb., 2 oz. Plastic case with built-in handle.

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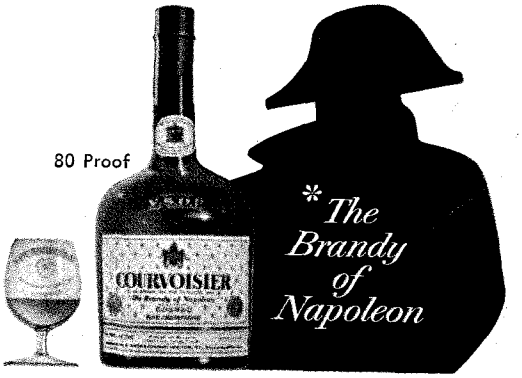

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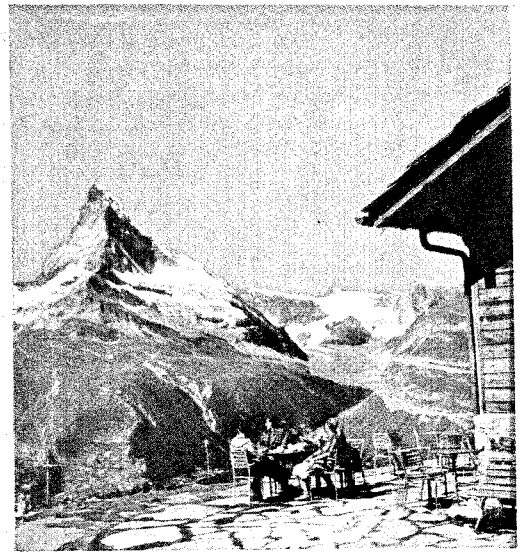
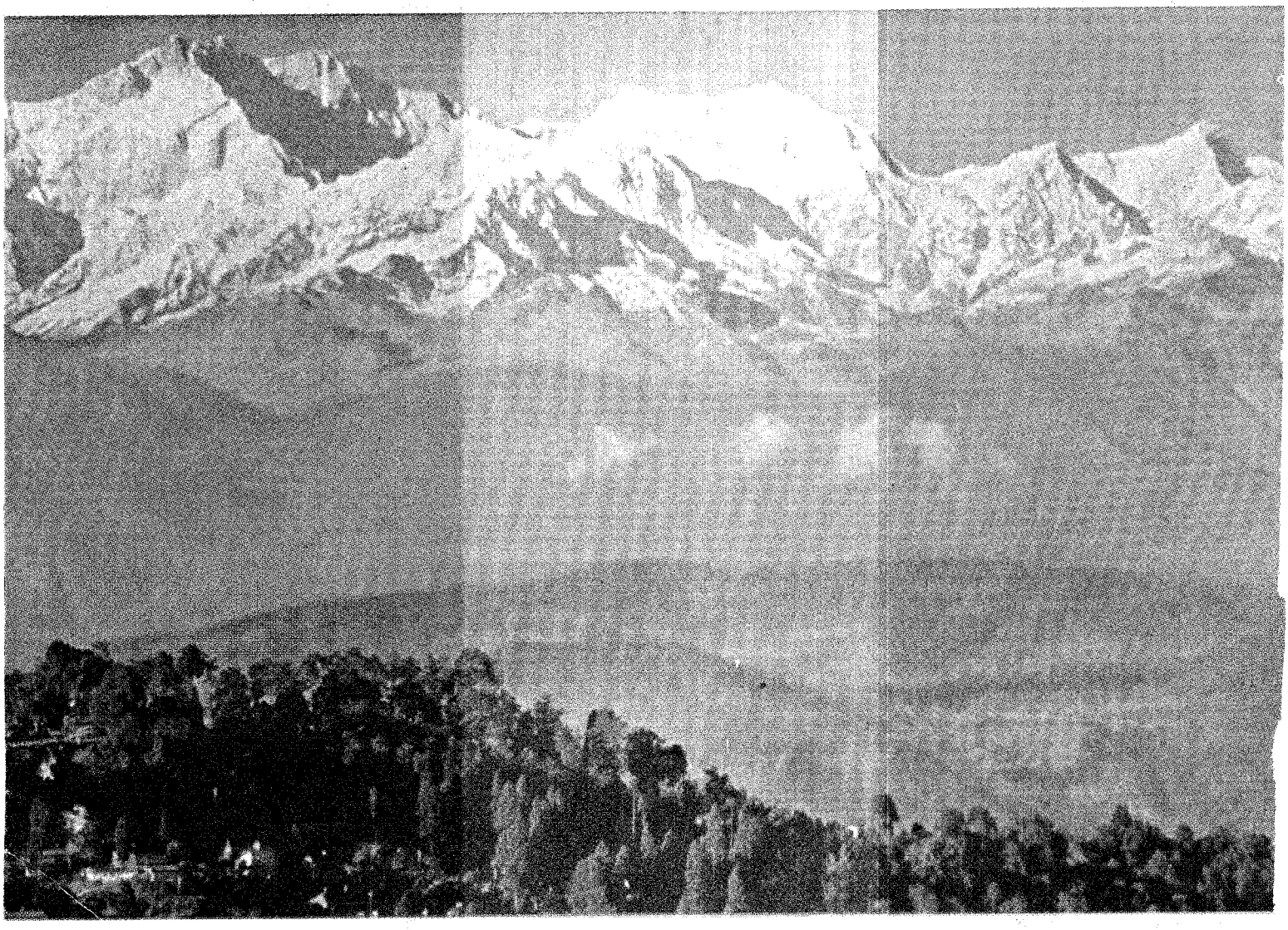


What could be closer to heaven than the Alps?



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